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The IRON AGE

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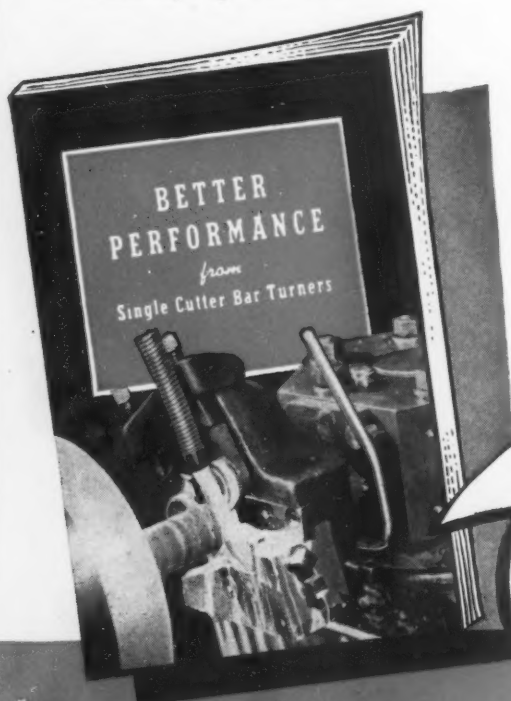
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THAT HOLE

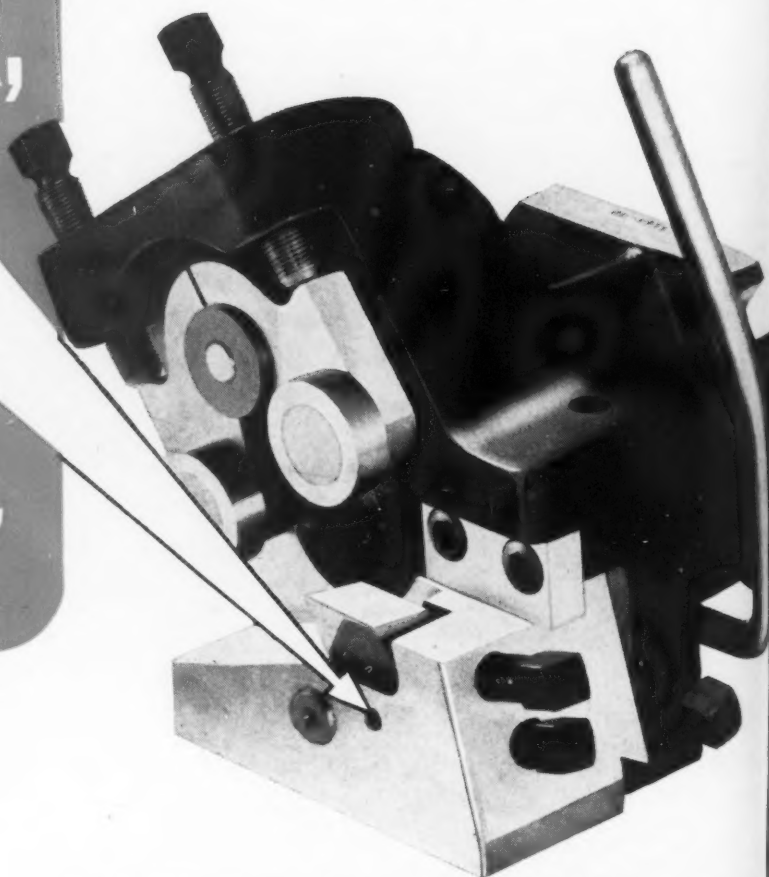
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APRIL 29, 1943

VOL. 151, NO. 17



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THE DUST FROM 24 GRINDER



Above is pictured the many grinding benches in the area served by the Mahon Hydro-Foam Dust Collector illustrated below. 26 additional Hydro-Foam Collectors clear similar areas and deposit the harmful abrasive dust safely under water. Combined they have a total capacity of 725,000 cubic feet per minute.

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THE IRON AGE

APRIL 29, 1943

ESTABLISHED 1855



Production Jitters

WHEN I was a lad of twelve, if you will excuse some personal reminiscences, I lived on the west bank of the Hudson, some fifteen miles north of New York. Every day during the summer at high tide, we used to go swimming, myself and about thirty-five other young chaps of the same age.

We were not nudists by conviction or choice, but most of us lacked the wherewithal to buy bathing trunks. So in our poverty and innocence and not knowing that watchful eyes were upon us, some of us ventured to bathe in the fashion set by our original ancestors.

One day a guardian of the law clad in blue and brass descended upon us. In fear and trembling, after we were clad, we were led to the magistrate's office. One cop and thirty-five prisoners. If we had only known then what we know now we would have dispersed to the four winds and let the devil take the hindmost!

Visions of life sentences in jail or the electric chair flashed through our minds as the JP told us how seriously we had offended public decency and morals. It is true that he let us off with an admonition and an injunction, but the terror of those moments is probably engraved deeply upon the minds of all of the surviving participants, most of whom now have long gray whiskers.

For the next twelve months or perhaps longer, I doubt if any one of us ever ventured to take a bath even in a bath tub. And thinking it over today, I can't help but feel that the right arm of the law could have been better exercised in circumventing serious crime than in preventing innocent even though unlawful action, and causing a lot of youngsters to go unwashed.

Man or boy, nothing will produce jitters and cold chills more than will the threat of the arm of the law. Whether one is innocent or guilty makes no difference.

I think it might be well to have a super-investigating committee to investigate the effect of investigations as to how these help or hinder the war effort. Certainly the tempest in a tea pot raised by the Truman Committee relative to ship plate inspection was productive of newspaper headlines, but whether these headlines plus the satisfaction afforded by them to a disgruntled ex-employee will make up for a new psychological bottleneck in inspection that is holding up thousands of tons of perfectly usable steel is indeed another question.

As our President has said: "Fear is the only thing we have to fear".

If the Truman Committee had wished to make an unbiased report to the American public, instead of instilling fear in the minds of our plate producing personnel, it might well have paid glowing tribute to the Herculean accomplishment of the steel industry in converting sheet and strip mills designed to produce thin sheets to the unvisioned task of producing thick plates.

Without this accomplishment we today would have less than one-half of our present cargo and transport ship production.

J. H. H. H. H. H.



Millions are "Injured" by a Single Accident

Not so many months have passed since an accident meant little more than some personal loss and a temporary, but easily adjusted, work schedule. Today, that situation is completely changed.

Every accident of the 9,000,000 that occur annually is a national liability, affecting, not only the output of the injured worker's shop, but also the production of other shops. Yes, a single accident "injuries" millions—millions of other workers who are trying desperately to reach maximum war output—millions of American citizens who are striving to retain their freedom—millions of American fighting men who never can have all the equipment and supplies they need for

Victory so long as America is careless on the home front. Anything you can do to prevent accidents will be a real contribution to America's fight for freedom. Remove hazards at home, drive carefully, be considerate of others in traffic, observe safety rules when at work, promote safety and safety programs no matter what your position may be.

Start today! Think safety, promote safety! Keep more workers on the job for Victory!



Enlist today in America's great crusade against accidents. For complete information write to the National Safety Council's War Production Fund to Conserve Manpower, Chrysler Building, New York City.

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Arc Welding Electrodes—

How They Are Made

By H. O. WESTENDARP, JR.

Welding Engineer, General Electric Co.,
Schenectady

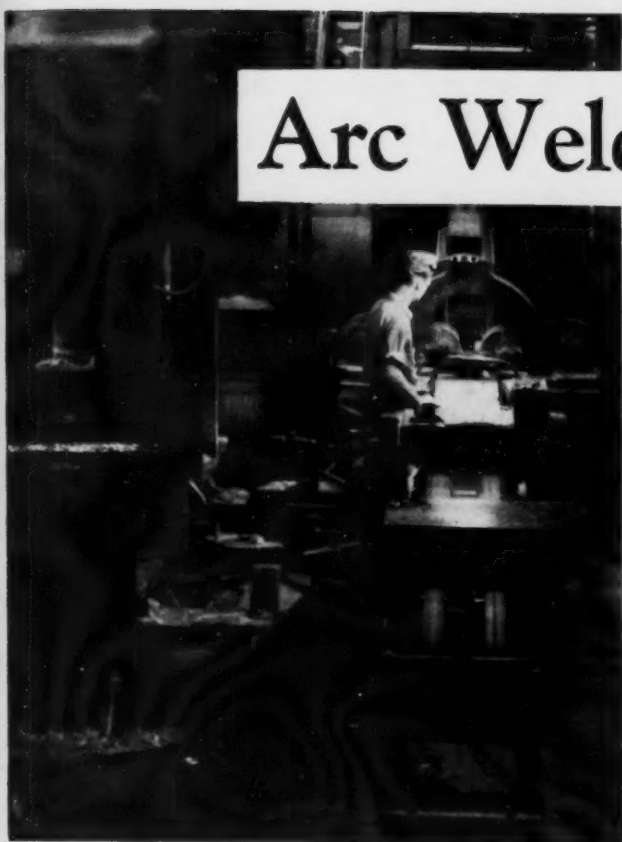


FIG. 1—Front end of electrode extrusion line showing part view of the extrusion press (on left) and also motor-driven rotary stripper for cleaning holder end of electrode. Conveyor runs into drying oven in background.

... In the first part of this article the author describes briefly the process of making mild steel electrodes and in more detail the purpose and the effect of various types of coatings on the electric arc and the resulting deposited weld metal. In the concluding part, Mr. Westendarp will discuss how to use electrodes for mild steel welding.

THE arc welding electrode, unimpressive in appearance, is actually one of the most vital production tools in the war program today. It is the bond with which ships, tanks, guns, and practically all our weapons of defense and offense are being fabricated. Through improvement in design and use, it is one of the most important factors in expediting our war production.

How Electrodes Are Made

In making mild steel electrodes, a steel rod is drawn down to size at the steel mill, straightened and cut into proper lengths. Wire diameter is held to plus or minus 0.002 in. and length to plus or minus 1/16 in. All electrode wire must be straight and without bow. The cut lengths are dumped into

a V-shaped hopper from which they are dropped one after another into a propelling mechanism which drives them at high speed through the extrusion die block of a hydraulic press.* In this die block, the coating is extruded at high pressure onto the bare wire.

Arc welding electrodes are ejected from the die block at a high rate of speed and land on a moving conveyor, Fig. 1. This takes them to a rotating stripper brush which removes a portion of the flux coating from one end of the electrode. Modern design re-

quires that this bare portion be kept to an absolute minimum to conserve electrode material. The average bare portion of 5/32 in. diameter electrode and smaller is 5/8 in.; above 5/32 in. diameter, 3/4 in.

From the stripping device, the electrodes are conveyed through ovens where the coating is properly dried. From the oven, electrode is conveyed to weighing and packaging equipment which insures uniform weight in the cartons in which the electrodes are shipped to the user.

In transit through the production line, all electrodes are under the constant and close surveillance of inspectors, Fig. 2, who examine them carefully for visible surface defects.

Concentricity of Coatings

Special mechanical and electrical instruments are used to keep close check on the concentricity of the coating which is held to very narrow limits. A concentric coating, of course, means that the thickness is uniform around the complete circumference of the electrode. When the coating is off-center (thicker on one side than

* For a more detailed description of this operation as carried on in another type of hydraulic press, the reader is referred to the article "Extruded Coatings on Welding Electrodes," THE IRON AGE, Feb. 11, p. 67.

the other), it is defined as eccentric. Since a slightly eccentric coating can be used, but a coating that is off-center beyond certain limits can cause serious trouble, the Navy Department and other regulatory bodies have set eccentricity limits beyond which material is rejected.

In this regard, American Welding Society Specifications read: "The covering on covered electrodes of all sizes shall be concentric to the extent that the maximum core plus one covering dimension shall not exceed the minimum core plus one covering dimension by more than 3 per cent." This 3 per cent limitation corresponds to an approximate difference in a certain type of electrode of 0.004 in. in 1/8 in. diameter; 0.005, 5/32 in. diameter; 0.006, 3/16 in. diameter; 0.009, 1/4 in. diameter; 0.011 in., in 5/16 in. diameter. The extrusion of arc welding electrodes at the high rates of speed being attained today and within these narrow limits of eccentricity, represents a real manufacturing problem that requires precise control and highly refined apparatus.

If extrusion pressures are too low, proper adherence of flux is not obtained and surface appearance is poor. Cross checks in coating at right angles to electrode may be observed. If extrusion pressure is too high, longitudinal pressure cracks are developed in the coating. If oven temperature is too low or conveyor speed too high, the coating is left too wet, causing blisters. On the other hand, if the oven temperature is too high or the conveyor speed too low, the electrode is overbaked. It looks burned in appearance and proper shielding is not obtained.

One of the purposes of the coating is to generate a gaseous shield around the arc. This gaseous shield protects the electrode metal from the oxidizing and nitriding effect of the atmosphere during its transfer across the arc. The ingredients of the coating also form a slag blanket over the deposited weld metal, retarding its cooling rate and further protecting it from atmospheric contamination.

The ductility of mild steel plate of good welding quality is approximately 22 to 25 per cent elongation in 2 in. Bare or lightly coated electrode will deposit weld metal ranging from 6 to 10 per cent elongation. It is obvious that the application of such electrode is limited to products that will not be required to stand high or repetitive stresses. Heavily coated electrodes deposit weld metal which ranges from 17 to 30 per cent elongation, thus greatly extending the field of application to innumerable products.

Coating Compositions

Since the coating is the key to the successful functioning of the electrode, it is important to distinguish the principal types of coatings. There are three general classes of mild steel electrode coatings as follows:

Cellulosic (Organic)—This is sometimes referred to as the high ignition-loss type due to the fact that a considerable portion of the cellulose coating burns out in the form of a gas in the arc. This type coating contains such ingredients as sodium silicate, alpha-cellulose, asbestos, ferromanganese and titanium dioxide. This is a high quality coating for use on all-position type rods, but is suitable for operation on direct-current, reverse polarity only. Arc action is forceful, having spray transfer and deep penetration.

Mineral—This is sometimes referred to as a high slag-forming type coating due to the abundance of slag for ample coverage and complete shielding. This type coating contains such ingredients as sodium silicate, ferromanganese, iron oxide, silica or quartz, and a small quantity of alpha-cellulose. Electrodes with such coatings are normally confined to welding in the horizontal and flat positions and can be operated from a.c. or d.c., either straight or reverse polarity. Deposit from such electrode is of high quality.

Rutile (Titanium dioxide)—This is also a mineral coating. Rutile coated rods have a moderate thickness of coating of such nature that globular

transfer and a rapid rate of solidification is obtained which adapts this type to joints having relatively poor fit-up. This type coating has an abundance of rutile (TiO_2), some ferromanganese, feldspar and sodium silicate. This is an all-position, general-purpose type suitable for operation on straight polarity d.c. or on a.c.

All coatings, of course, contain numerous other ingredients in small quantities. Sodium silicate is the principal binder used in all electrode coatings. Titanium dioxide, feldspar, and calcium carbonate are the principal stabilizers and ferromanganese is a deoxidizer used for porosity control and also to balance deposits by replenishing manganese burned out in arc transfer. Generally speaking, alloying ingredients, such as molybdenum, can be added to coatings and have good transfer characteristics.

The objective of the development laboratory is the thinnest coating that will produce the required physical properties and "usability characteristics." The one exception to this aim is the cover bead electrode. The latter electrode is designed to produce smooth surface appearance and flat welds and therefore has a high flux-to-steel ratio in order to produce a complete and heavy slag blanket which can be removed easily and will reveal a smooth, flat surface of deposited weld metal beneath. Coating thicknesses of all other types are reduced as much as possible consistent with required physical properties and usability characteristics.

How A.W.S. Specifications Are Met

The American Welding Society has developed comprehensive specifications which take all conditions into full account and establish limits on physical values of deposited weld metal, covering high-quality, all-position type electrode; moderate-quality, all-position type electrode; and high-quality, horizontal and flat-position types. These specifications also set forth the requirements of the various electrodes from the standpoint of power supply and polarity. See Table I.

All-Position Type—All position-type electrodes must necessarily be confined in flux-to-steel ratios to values that permit good usability characteristics when welding in vertical and overhead positions. This requirement reduces the gas shielding slightly as compared to the flat-position type and when combined with the relatively lower amperages used in the vertical and overhead positions, represents a somewhat more difficult problem as far as "physicals" are concerned, particularly ductility of deposit. How-

TABLE I
A.W.S. Specifications for Mild Steel, Heavy Coated Electrodes
(A-233-42T)

Class	Position	Power Supply	As Welded		El. in 2 In. per cent
			Tensile Str. Lb./Sq. In.	Yield Pt. Lb./Sq. In.	
E6010	All	d.c. only	62,000	52,000	22
E6011	All	a.c. only	62,000	52,000	22
E6012	All	d.c. & a.c.	62,000	52,000	17
E6013	All	a.c. & d.c.	62,000	52,000	17
E6020	H & F	a.c. & d.c.	62,000	52,000	25
E6030	F only	a.c. & d.c.	62,000	52,000	25

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ever, ample ductility is being obtained from high-quality, all-position type electrodes when welding in vertical and overhead positions due to the improvement in coatings and welding technique.

Flat-Position Type — Flat-position type electrodes are used at relatively higher heat and have higher flux-to-steel ratios than the all-position type. These two factors combine to produce high physical qualities of deposited metal. Generally speaking, flat-position coatings are made just thick enough to give ample shielding to produce required physical properties. Excessive coating results in surplus slag which interferes with the welding operation. Coatings designed for flat-position welding generally form a cup at the end of the electrode which gives a directional control to the arc, thus facilitating welding. This also increases the arc voltage with a resulting increase in kilowatts as heat in the arc to develop high melting and deposition rates. Slag removal from deposits of such electrode is easy. These coatings meet the requirements of A.W.S. Classes E-6020 and E-6030.

V and O Positions—Vertical and overhead work require a somewhat thinner coating to permit a shorter arc and avoid a surplus of slag which would interfere with welding in these positions. Electrode coatings for V and O work are generally such that rapid solidification is obtained to facilitate welding. It is generally accepted that metal transfer across the arc is produced by a combination of gas pressure developed under the tip of the electrode as it is melted and of surface tension of the pool of metal in the welded joint. It is obvious,

o o o

FIG. 2—View in electrode manufacturing plant showing inspector's stand at exit end of drying oven.

o o o



therefore, that metal transfer against the force of gravity in the vertical, and particularly in the overhead position, must be accomplished within fairly narrow limits of arc gap as compared to the length of arc which can be successfully maintained when welding in the flat position where gravity aids the transfer operation. Vertical and overhead coatings cover A.W.S. Classes E-6010, 6011, 6012, and 6013.

Question of Polarity

Electrode coatings are not designed for a given polarity. They are primarily designed for other conditions

such as quality of deposit required and position in which welding must be done. They are then tested under both polarities with d.c. and with a.c. to determine the particular hook-up as to polarity that produces the best results. Through long experience, the electrode laboratory is familiar with the ingredients of coatings that respond favorably to one polarity or the other and to a.c. Since both types of equipment are available, the objectives of the electrode designer are primarily physical properties or usability characteristics of the electrode rather than polarity.

(To be concluded)

Steel Clad "Sandwiches"—Corrections

IN the article that appeared in the Feb. 18 issue of THE IRON AGE under the title, "Clad Steel 'Sandwiches' Welded by the Carbon Arc," an editorial "aside" gave the impression that the assembly method of producing clad steel was known as the Pluramelt process. The actual intent was to call the reader's attention to a previous description of an entirely different method of making armored steel (Pluramelt, THE IRON AGE, March 6, 1941, p. 35). The sandwich method has been in use for years and is correctly identified as the Armstrong process. The automatic carbon arc process of sealing the sandwich before rolling is a recent innovation. On page 57 the article appearing in the Feb. 18 issue, Table III, had

some errors in it. The revised table accompanies this notice. The lower cost per linear foot ap-

plies to the carbon arc process and not to the previous method as originally published.

TABLE III
Comparison of Welding Methods on a Linear Basis

Total Thickness In.	Number Welds Per Side Former Method	Number Welds Per Side Carbon Arc	Present Cost Per Ft.	Previous Cost Per Ft.*
3	1	1	\$.6063	\$0.7500
5	2	2	1.2126	1.5000
7 1/2-10	3	2	1.2126	2.2500
over 10	4	2	1.2126	3.0000

*The cost figures on the previous method were not available, but from very close contact with that machine and costs from similar machines, estimates are held to be conservative.

... What Causes Industrial

... Output depends on the mental and physical health of the worker. The effects of excessively long hours, inexperience and fear are some of the factors resulting in fatigue, which together with the cure are here presented.

STEADY pressure for maximum production from a practically fixed number of workers, inevitably suggests longer hours. The testimony of the chairman of the War Production Board before the Senate Military Affairs Committee in November, was, "A longer work week is one way to attain greater efficiency in the use of workers."

The longer work week may become the story of the farmer determined to economize on horse feed. A steady reduction of rations failed in only one particular. The horse died.

Discussing at a press conference the effect of longer work hours, President Roosevelt called attention to the reported increase of the work week from 48 to 70 and 80 hr. in Germany. A two-months' production spurt consequent upon these abnormally long hours, relapsed after that time to less production than from a 48-hr. week.

An interesting study was made by the British Health of Munitions Workers Committee on the factor of work hours in daily output. In a large industrial plant the work week was reduced from 74½ hr. to 63½, with a consequent increase of 21 per cent in production. A further reduction in hours from 63½ to 55½ produced a further increase of 29 per cent in output. Hence the total output from a 55½-hr. week was 13 per cent greater than from a 74½-hr. week.

A recent survey made by the Department of the Interior gives the following conclusions in relation to work hours that are considered justified by the evidence examined and considered: "(1) Every reduction in hours leads to a decrease in accidents, spoiled work, sickness and absence; (2) the reduction of working hours from 18 to 10 leads to an increase in hourly and daily output; (3) the reduction of working hours from 10 to 8 leads to a further increase in hourly and daily output, except in operations where speed depends mainly on the speed of machines; (4) the reduction of working hours below 8, though increasing hourly output, does not usu-

ally lead to an increase in daily output."

Fatigue Causes Accidents

Not only are long work days and resultant fatigue a major factor in output decline but a factor fully as great in accidents, injuries and a consequent loss of hours. In *Health in Relation to Occupation*, H. M. Vernon relates an incident that serves vividly to illustrate this danger.

Ten thousand workers were employed in a fuse factory, on a 12 hr. per day schedule. Subsequently hours were reduced from 12 to 10. Accidents experienced by women workers during the 12-hr. period were 2.73 times greater than with a 10-hr. work day. Men, better able to endure this fatigue of the long hours, experienced 1.14 times the accidents of the 10-hr. day when working on this longer schedule. In a survey made some time ago of the causes of 1300 accidents, referred to in *Safety Engineering* magazine for May, 1941, 25 per cent were caused, directly or indirectly, by fatigue.

The unprecedented demands now made on the productive capacity of industry conjures up this destructive factor of fatigue, not only in a temptation to adopt over-long working days but in the necessity for greatly increased numbers of workers. Here, too, fatigue plays its disastrous part in the proneness of "green" employees to accidents. Any workman, unfamiliar with a job and the methods and technique of his work, uses more energy in the same period of time than a skilled worker or one familiar with the work. A classification made by the National Safety Council, Inc., of 35,000 non-fatal injuries, showed approximately 15 per cent experienced by skilled workers, 45 per cent by semi-skilled and 40 per cent by unskilled workers.

The definition of fatigue, given by the Health of Munition Workers Committee of the British Association, is, "The sum of the results of activity which shows itself in a diminishing capacity for work." A much more

satisfactory and comprehensive description is given in *Outlines of Industrial Medicine Practice* by Howard E. Collier:

"A general term applied to a variety of reactions of workers to their industrial environment. These reactions manifest certain common characteristics which are objective and physical, and subjective or psychological in nature. The essentially physical characteristics of fatigue is diminished capacity for continuing the fatiguing task and a diminished capacity following the long sustained performance of that task. The essential psychological manifestation of fatigue is an increased disinclination to continue working. . . . The fatigued worker begins to lose interest in his work and then experiences active disinterest or boredom. If the same occupation is continued, increasing annoyance and irritation may result—the stage at which industrial fatigue tends to produce industrial unrest."

Psychological Factors Important

"The causes of fatigue," says a study of the United States Bureau of Mines, "may be physical or psychological. It is apparent from the literature that psychological and environmental factors are more important causes of fatigue than physical factors." Collier mentions two types of fatigue. One arises from the central nervous system and to some extent from the active muscles. The other has its source entirely within the nervous system. The latter type is the ordinary industrial fatigue.

"When functions of the outlying organs are neglected," writes Dr. Mitchell, "and even in many cases where these have not suffered at all, we are put to witness, as a result of a too prolonged anxiety combined with business cares, or even of mere overwork alone, with want of proper physical habits as to exercise, amusements and diet, that form of disorder of which I have already spoken as cerebral exhaustion. . . . Why it should be so difficult of relief is hard to comprehend until we remember that the brain is about to go on doing its weary work automatically and despite the will of the unlucky owner, so that it gets no thorough rest and is in the hapless condition of a broken

al

Fatigue?

By ALBERT GRAY
New York

limb which is expected to knit while still in use."

It is obvious from this analysis of Dr. Mitchell, and this is confirmed by contemporary authorities, that fatigue results from an improper balanced "intake" and "output." The two types of activity must be balanced.

In fatigue, the factors are time, environment, social contacts, domestic relations, all the items that serve to destroy or preserve the emotional balance of the worker.

Lactic Acid-Sugar Balance

According to Reynold A. Spaeth, in the *Journal of Industrial Hygiene*, this "intake" and "output" are, roughly, represented by sugar, oxygen and lactic acid. "The work reaction of muscle is limited and regulated by the accumulation of lactic acid, one of its products. During and following human muscle activity lactic acid and certain other products of muscular work are removed, in part, mechanically, by irrigation of the circulation. The blood, likewise, deposits sugar in the muscles and thus constantly replenishes the stores of high potential energy. It is possible for a muscle to work at such a rate that the removal of acid is exactly as rapid as the deposit of sugar. The muscle is then in the condition of dynamic equilibrium and may continue almost indefinitely."

Excessive and violent muscular activity serves to increase the deposit of lactic acid. When the acid deposit has reached the maximum content of 0.28 per cent, the worker is unable to exert further muscular effort and exhaustion ensues. Lactic acid, however, decreases with the introduction of oxygen into the muscle fibers.

The decreased "intake" of sugar and oxygen and its effect on the accumulation of lactic acid and consequent fatigue, however, appear to be a more or less intermediary cause and a result of a loss of emotional balance and equilibrium on the part of the worker.

Dr. G. Canby Robinson, of the

National Research Council, remarks: "It is difficult to say how large a part adverse social conditions and maladjusted personalities in industry play in the development of psychoneuroses with its great variety of physical manifestations, but it can be said that the desire is the base of more chronic illness than any other human disturbance and intelligent efforts to learn the part industrial conditions play in its production are an important part in preventive medicine and the improvement of industrial health. These efforts can only be made by a greater knowledge of the worker as an individual."

The speeding up of production, working under crowded conditions in temporary structures, the tension arising from a work rhythm determined, not by the worker himself, but by the machines, minimize or destroy the pleasure in the work itself, destroy the emotional balance of the worker and kill whatever pleasure might otherwise be gained in hours away from work.

"A factor that is becoming apparent," writes Ernest Bevin, the English labor leader, "is that you get better discipline and loyalty with the fear of dismissal removed than you do by the threat of it." By so much as emotional loss of balance and the strain from inharmonious conditions is removed, by that much is fatigue and its disastrous train of consequences overcome.

"Every man has his barrier," said Brigadier General Grant of the Army Medical Corps in reference to combat fatigue. "The army tries to prevent a flier's passing that barrier by providing plenty of rest."

"Eat regularly and exercise freely and there is scarce a limit to the work you may get out of the thinking organs," wrote Dr. Mitchell. "But if into the life of a man whose powers are fully taxed, we bring the elements of great anxiety and worry, the whole machinery begins at once to work, as it were, with a dangerous amount of friction. Add to this the constant fatigue of body and we have all the means needed to ruin a man's power of labor."

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Turnings Charged

THE huge volume of war equipment requiring extensive machining that is being turned today is resulting in a tremendous accumulation of alloy steel turnings which have relatively high contents of strategic alloys. From a steel producer's viewpoint, these turnings in the "as produced" or bushy state are about the least desirable form of scrap available because of the extra time required to charge them into the furnace for remelting and the difficulty in handling them.

The extra time spent charging the furnace is time lost in production and directly reduces steel output. The least loss of steel production could easily cancel out any technical advantage derived from melting such material. Another reason that steel turnings are classified among the less desirable forms of scrap is that experience has proved that the majority of turnings consumed in the past have been very poorly segregated as to their alloy content.

Starting immediately, the alloy steel producers in the United States must consume approximately 250,000 tons of alloy turnings per month, or about 8 per cent of their scrap requirements. If these turnings are not kept segregated, as has been the case in the past, it means that chemical analyses will be more difficult to maintain and that steels specifying only one or two alloys will be ex-

tremely difficult to melt because of the presence in the turnings charged into the heat of all three of the alloying elements: chromium, nickel, and molybdenum.

Steel producers have been aware for some time that this accumulating stock of metallics would eventually

have to be remelted and the alloy contained in the turnings returned to circulation. Several methods of reducing bushy turnings to a reasonably desirable form of scrap have been investigated, some of which are: (1) Baling, (2) briquetting, (3) burning and quenching, (4) chopping or

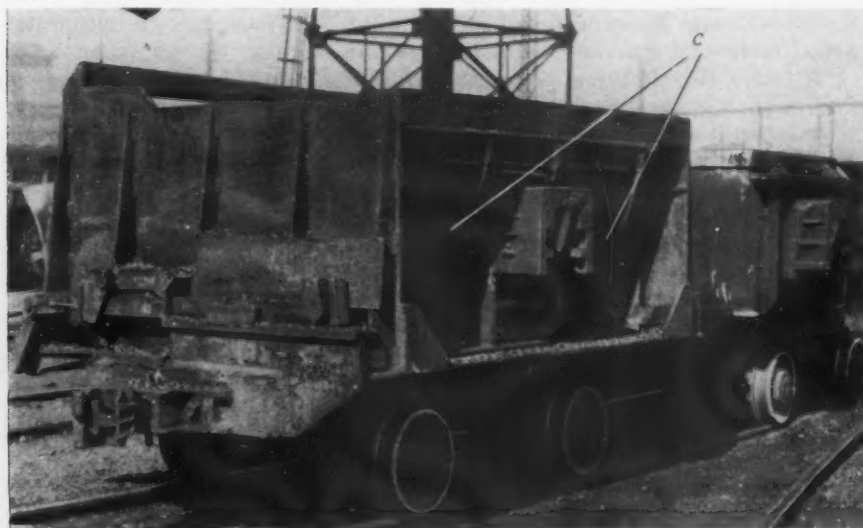
RIGHT

FIG. 2—This rear view of the charging car shows the load being pushed forward into the furnace by a standard charging machine. The open hearth door had to be enlarged to accommodate the bigger scrap box and the scrap charging car.

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BELOW

FIG. 1—This is the 224 cu. ft. scrap charging car. The pusher plate, "C", moves forward, actuated by the peal on the charging machine. The gate operating mechanism can be seen on the forward end of the car.



shredding, and (5) remelting in special cupolas and crushing. Each of these methods, when viewed from an economical quality or utility standpoint, seems to have specific shortcomings.

After considerable investigation, and because the method seemed more adaptable where the turnings eventually must be used in blast furnaces as well as in open hearth furnaces, it was decided that the bulk of the turnings to be consumed at the Republic Steel Corp. plants in Canton and Massillon districts would be crushed. From experience with crushed turnings procured from plants having crushing equipment, it was known that when a reasonable job of crushing was done, the turnings could be handled satis-

With Pusher Boxes

factorily by ordinary blast furnace charging equipment. When charged into the blast furnace, there is little or no loss in time and it is quite possible that the production of iron may be actually increased. However, it will in most cases be contaminated to some degree by chromium, nickel, and molybdenum, and such pig iron will be difficult to use for making other than chromium-nickel-molybdenum steel.

When crushed turnings are charged into the open hearth in large quantities by regular equipment, charging time is increased and production slowed down proportionately. It was because of this fact that attention was directed to a new charging box design and enlarged furnace doors on the open hearth furnaces. Large ex-

... To utilize an ever-increasing stockpile of metallics, WPB has ordered that alloy steel producers take 8 per cent of their scrap requirements in alloy turnings. To overcome problems in handling turnings, Republic Steel Corp. has designed new open hearth charging boxes.

perimental welded scrap charging boxes have been designed especially for charging crushed turnings, having a capacity of 106 cu. ft. One scrap car can accommodate two of these boxes. The ordinary cast steel charging box has a capacity of 31.5 cu. ft. and is handled four to a car. Another type of experimental scrap turning charging unit is shown in Fig. 1. This is a single charging box welded to the car, forming an integral part of the car. Its capacity

is 224 cu. ft., and as may be seen in the illustration, there is only one box on a car.

When this car is stationed before the large open hearth door, the charging machine peal is used to lower the charging car gate. This is accomplished by depressing the latch operating a trigger which disengages a latch and permits the gate operating bar to move forward and lower the discharge gate into the furnace door.

After the gate is lowered, the charging machine engages its peal with the pusher plate shown in C in Fig. 1, and the ram moving forward discharges the chips from the box into the furnace. Fig. 2 shows the charging machine pushing the turnings into the furnace. After the gate is lowered into the furnace door and the turnings are pushed in, the pusher plate is withdrawn to its original position, the peal is disengaged and hooked over the gate operating bar, which returns to its original position. This raises the gate and engages the latch which holds the gate in a vertical position, ready for reloading.

A wide door was installed in one of the open hearth furnaces to accommodate these large scrap charging boxes. The enlarged door has the second advantage in that it permits the charging of large pieces of skull or pit scrap. The standard open hearth door at Canton works is 3 ft. 6 in. wide x 4 ft. 5½ in. high at the center. The special door is 10 ft. 4 in. wide x 4 ft. 5½ in. high at the center. The large welded, but otherwise conventional, charging box of 106 cu. ft. capacity is shown in Fig. 3, having entered the large furnace door and being dumped inside the furnace. This large welded box has the same disadvantage as the special charging car in that it can be used only in the early part of the charge. In the later part of the charging operation, there

(CONCLUDED ON PAGE 117)

Conventional vs. Special Scrap Charging Units for Handling Turnings

Charge Medium	No. Boxes Per Car	Total Scrap Charge, Lb.	Charging Time, Min.	Charge Per Min., Lb.
Regular charging box	four	7200	2	3600
224 cu. ft. charging car	one	12,000	1.5	8000

FIG. 3—The 106 cu. ft. welded charging box is handled much in the same manner as the smaller boxes of conventional design. Two of these boxes can be handled by a scrap car, and the charging machine handles them in the same manner as it does with the ordinary scrap box.



Beryllium

Wanted

... The demand for beryllium-copper alloys is 40 per cent above the supply. The U. S. needs a 10,000-ton stockpile and a mountain of beryllium ore, the War Metallurgy Committee reports.

THE discovery of one or more "mountains" of beryllium ore is badly needed, the War Metallurgy Committee of the National Academy of Sciences has reported to WPB. The report prepared by the committee says that present scheduled requirements of beryl ore of 6000 tons in 1943 represent an opinion as to available supplies rather than maximum quantities that would be used if more could be obtained.

The chief use of beryllium is for beryllium-copper alloy to obtain a strong, heat treated metal for electrical contacts, clips, small springs, diaphragms, etc. For the production of these alloys, a master alloy containing 4 to 4.5 per cent beryllium is first produced. The final alloy has a beryllium content varying from 0.3 to 2.5 per cent. Virtually 100 per cent of beryllium-copper distribution is now going to vital components of direct and indirect military end products. Accordingly, says the report, if the supply is insufficient, substitute materials will have to be found, with phosphor bronze, aluminum bronze and alloy steel the most likely possibilities.

Alloys containing less beryllium than the conventional 2 per cent will probably suffice for many uses. Recent work on low temperature heat treatment of cold worked brass and bronze has resulted in the replace-

ment of beryllium-copper springs, in some instances, with non-beryllium copper alloys. In many cases, however, where small parts are involved, design factors explain the use of the alloy. In many aircraft instruments it is used because its properties make possible the use of a smaller part than would be necessary with other materials.

Beryllium-copper is heat treatable to produce the strongest copper-base alloy. Extensive studies have been carried out in various laboratories to broaden the use of beryllium-copper alloys and to take advantage of their properties of high fatigue strength; elastic limit and hardness; relatively high tensile strength and electrical conductivity; excellent corrosion resistance; good wear resistance; good resistance to galling against steel and good resistance to room temperature creep (elastic drift); and various fabrication advantages associated with heat treatment or precipitation hardening. Such studies, in the presence of the war effort, have

now borne fruit to such an extent that the demand exceeds the supply. Both copper and tin are conserved by the use of beryllium-copper alloys, where they replace other copper-base alloys.

There can be no doubt as to the relative superiority of this alloy for many important applications in both the peacetime and the wartime economy. At the present time beryllium-copper is being used in parts of aircraft, ships, tanks, guns, shells, instruments, engines, motors, radio, telephones, telegraph, tools, and electrical control equipment for machinery and fire protection.

Currently the production of beryllium-copper master alloy is at the rate of about 3,000,000 lb. a year. The demand appears to be about 40 per cent above the supply. However, expansion of facilities for the production of master alloy are under way, sufficient to produce around 10,000,000 lb. annually. No corresponding

(CONTINUED ON PAGE 118)

TABLE I
World Production of Beryllium
(Net Tons)

Country	1935	1936	1937	1938	1939	1940	1941	1942 (6 months)
Argentina	208	331	287	830	329	573	2200	1030
Australia					7	2		
Brazil		4		223	304	1622	1814	403*
Canada		20	20	10	177			25
India (British)	139	98	27	17	9			224
Madagascar	11	11	2	2				
Portugal	2	2	24					
South Africa	88	5						23
U. S.			75	25	94	121		75
Known Total	448	471	435	1107	920	2318	4014	1780

Beryl may also be produced in France, Italy, Rumania, Scandinavia and U.S.S.R.
*U. S. imports only.

Aeronautical Material Specifications

THESE seven pages of tables show in condensed form the current AMS (Aeronautical Material Specifications) which pertain to steel, as compiled by Joseph T. Ryerson & Son, Inc. These briefs are not complete but they do contain the essential qualifications. They can be used as a handy guide for identification. Complete specifications may be obtained from the Society of Automotive Engineers, 29 West 39th Street, New York. These should be consulted when complete details are required because they include important limitations on hardenability, structure, cold bending, size tolerance, marking, test reports, etc.

AMS-	COMPOSITION					FORM	QUALITY	CONDITION
	C	Mn	P	S	Si			
5010A Issued 1/22/40 Revised 3/1/42	.08 / .13 An approved	.60 / .90	.09 / .13 alternative composition	.16 / .23	..	Cold Drawn Screw Stock bars.	Uniform, within specified quality limits.	Bars: 1" section and under, 170 to 255 B.H.N., over 1" section 156 to 201 B.H.N.
5022A Issued 1/22/40 Revised 3/1/42	.14 / .20 When tubing	1.00 / 1.30 is supplied, Mn	.045 max. / .13	.08 / .13 Manganese	.15 max.	Manganese free cutting bars, billets, forgings, tubing or as ordered. e up to 1.50 permitted.	Uniform, within specified quality limits.	Bars and tubing: Cold finished; 1" section and under 156-207 B.H.N.; 1" to 3"—143 to 197 B.H.N.; 3" and over 116 to 163 B.H.N. Suitable for high-speed automatic screw machine. Other forms see specification.
5024A Issued 1/22/40 Revised 3/1/42	.32 / .39 Cold	1.35 / 1.65 finished	.045 max. unless	.08 / .13 otherwise orde	.15 max.	Manganese free cutting bars, billets, forgings, tubing or as ordered.	Uniform, within specified quality limits.	Bars and tubing: Cold finished; 5/8" section and under 207 to 255 B.H.N.; over 5/8" to 1"—187 to 255 B.H.N.; over 1" to 3"—170 to 241 B.H.N.; over 3"—149 to 217 B.H.N.; other forms see spec.
5025 Issued 3/1/42	.32 / .39	1.35 / 1.65	.045 max.	.08 / .13	.15 max.	Manganese free cutting bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Bars: Quenched and tempered 217 to 255 B.H.N. from surface to center. Other forms see spec.
5033 Issued 12/1/42	.05 / .20 Basic	.30 / .60 steel wire	.045 max.	.055 max.	..	Low carbon zinc coated steel wire.	Uniform Commercial Quality, with special requirements regarding coating.	Annealed definite physical properties as outlined by the spec. and which vary with thickness.
5040B Issued 3/13/40 Revised 12/1/42	.08 / .13	.30 / .50	.04 max.	.05 max.	..	Low carbon, cold rolled, deep drawing sheet and strip.	Uniform, within specified quality limits.	Cold rolled and oiled, Rockwell hardness B 38-52. Bend test requirements.
5042B Issued 3/12/40 Revised 12/1/42	.08 / .13	.30 / .50	.04 max.	.05 max.	..	Low carbon—cold rolled forming quality sheet and strip.	Uniform, within specified quality limits.	Cold rolled and oiled Rockwell hardness range B 52-64 thickness .1875 and under; and range B 45-64 thicknesses .1876 and over. Bend test requirements.
5044 Issued 12/1/42	.08 / .13	.30 / .50	.04 max.	.05 max.	..	Low carbon—cold rolled half hard sheet and strip.	Uniform, within specified quality limits.	Cold rolled and oiled T.S. 60,000 psi min. 75,000 psi max. Elong. 4% min. in 2" and Rockwell hardness B 70-83. Bend test requirements.
5050 Issued 12/4/39	.15 max.	.60 max.	.045 max.	.055 max.	..	Low carbon seamless tubing.	Uniform, within specified quality limits.	Normalized or annealed to give minimum elongation 35% in 2" with full section test piece; or 25% in 2" with strip test piece. Flaring test required.
5053 Issued 6/1/42	.15 max.	.60 max.	.048 max.	.058 max.	..	Low carbon welded tubing.	Aircraft Quality.	Normalized or annealed to minimum elong. 35% in 2" with full section test piece; or 25% in 2" with strip test piece.
5060A Issued 3/13/40 Revised 3/1/42	.13 / .18	.30 / .50	.04 max.	.05 max.	..	Low carbon bars, billets, forgings, tubing or as ordered.	Uniform, within specified quality limits.	Bars and heavy wall tubing in a machinable condition 229 B.H.N. max., unless otherwise ordered. Other forms see spec.
5070 Issued 1/15/42 Revised 3/1/42	.18 / .23	.70 / 1.00	.04 max.	.05 max.	..	Low carbon bars, rods, billets or forgings.	Uniform, within specified quality limits.	Unless otherwise ordered, bars "as rolled" or cold finished min. physicals, T.S. 55,000 psi, Y.S. (.2% set) 36,000 psi, equivalent extension under load .0064" in 2". Elong. 22% in 2". For each 2000 psi in excess 55,000 psi. T.S. a reduction in elong. of 1% to a min. 10% allowed. Above properties also required when normalized from 1625°-1675°F. Other forms see spec.
5075 Issued 3/1/42	.22 / .28	.30 / .50	.04 max.	.05 max.	..	Seamless carbon steel tubing.	Aircraft Quality.	Cold drawn and sufficiently stress relieved to some minimum physicals as outlined AMS 5070. When normalized by heating to 1625°-1675°F. and cooling in still air shall develop same min. physicals.
5077 Issued 6/1/42	.22 / .28	.30 / .50	.04 max.	.05 max.	..	Welded carbon steel tubing.	Aircraft Quality.	"As welded," or normalized, or sufficiently stress relieved if cold drawn to provide min. physicals outlined AMS 5070 and 5075. Normalized physicals as on above spec.
5080 Issued 6/1/42	.32 / .38	.60 / .90	.04 max.	.05 max.	..	Carbon steel bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Bars in a machinable condition 229 B.H.N. Max. unless otherwise ordered. Other forms see spec.

AMS—	COMPOSITION										FORM	QUALITY	CONDITION	
	C	Mn	P	S	Si	Ni	Cr	Cu	Cb					
5110 Issued 12/4/39	Shall be that of plain carbon steel music wire.											Cold drawn music wire supplied in coils or as finished springs.	Uniform, within specified quality limits.	Must have definite tensile properties as set forth by spec. ranging from 200,000 psi min. to 300,000 psi. min. depending on diameter.
5112A Issued 12/4/39 Revised 9/1/41	.75 / .95	.25 / .60	.03 max.	.03 max.	..	..	..	..	..		Cold drawn music wire supplied in coils or as finished springs.	Special Requirements. See spec.	Must have definite tensile properties as set forth by spec. ranging from 230,000 psi. min. to 300,000 psi. min. depending on diameter.
5115 Issued 3/1/42	.65 / .75	.70 / 1.00	.04 max.	.05 max.	..	..	..	..	..		Cold drawn, hardened and tempered wire supplied in coils or as finished springs.	Special Requirements. See spec.	Hardened and tempered to produce definite T.S., Elong. and Red. of Area as set forth by spec. depending on diameter.
5120 Issued 3/1/42	.65 / .75	.70 / 1.00	.04 max.	.05 max.	..	..	..	..	..		Spring steel, sheet or strip.	Uniform, within specified quality limits.	Cold rolled and annealed 1/16" thickness or less and either cold or hot rolled annealed in heavier sections as specified. Special restrictions depending on applications.
5121 Issued 6/1/42	.90 / 1.05	.30 / .50	.04 max.	.05 max.	..	..	..	..	..		Spring steel, sheet or strip.	Uniform, within specified quality limits.	Same as for 5120.
5122 Issued 1/23/40	.90 / 1.05	.25 / .60	.04 max.	.05 max.	..	..	..	..	..		Hard steel, sheet or strip.	Uniform, within specified quality limits.	Heat treated or cold worked to Rockwell Hardness C40 to 45. If approved by purchaser harder material or parts may be supplied provided bend test requirements are met.
5132 Issued 11/1/41	.90 / 1.25	.15 / .40	.04 max.	.04 max.	.35 max.	..	..	..	..		High carbon bars, rods or as ordered.	Uniform, within specified quality limits.	Annealed to 170-228 B.H.N. and have definite microstructure. Surface decarburization limitations.
5510B Issued 12/4/39 Revised 11/1/41 6/1/42	.10 max.	2.50 max.	.04 max.	.04 max.	1.50 max.	7.00 min.	17.00 min.	.50 max.	8xC min. or Ti 4xC min.		Corrosion and heat resistant sheet and strip.	Uniform, within specified quality limits.	Solution heat treated (completely austenitic annealed and pickled). T.S. max. 100,000 psi. and elong. in 2" min. 40% when pulled at rate of .05" per minute. Bend and embrittlement test requirements.	
5515A Issued 11/1/41 Revised 6/1/42	.15 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	.50 max.	..		Corrosion resistant. Deep and shallow forming Quality sheet and strip.	Uniform, within specified quality limits.	Hot rolled, solution heat treated (completely austenitic annealed) and pickled. T.S. max. 120,000 psi Elong. in 2" 50% min. thicknesses up to .025"; and 55% min. on thicknesses .025" and heavier, when pulled at rate of .05" per minute. Bend test requirements.	
5516A Issued 1/23/40 Revised 6/1/42	.15 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	..	..		Corrosion resistant cold rolled sheet and strip.	Uniform, within specified quality limits.	Annealed, pickled, and cold rolled. Tensile 75,000-100,000 psi and Elong. 40% min. in 2" when pulled at rate of .05" per minute. Bend test requirements.
5517A Issued 11/1/41 Revised 6/1/42	.15 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	.50 max.	..		Corrosion resistant cold rolled high ductility type sheet and strip.	Uniform, within specified quality limits.	Hot rolled, solution heat treated (completely austenitic annealed), pickled and cold rolled (#2B finish). T.S. shall be 125,000-150,000 psi Y.S. 75,000 psi min. Extension under load .0098" in 2". Elong. 25% min. in 2" when pulled at rate .05" per minute. Bend test requirements.	
5518A Issued 11/1/41 Revised 6/1/42	Same as 5517A										Same as 5517A.	Uniform, within specified quality limits.	Same as 5517A except T.S. 150,000 psi min. Y.S. 110,000 psi min. Extension under load .0125" in 2". Elong. in 2" 15% min. thicknesses up to .015" and 18% min. thicknesses over .015".	
5519B Issued 1/23/40 Revised 11/1/41 6/1/42	Same as 5517A and 5518A.										Same as 5517A and 5518A.	Uniform, within specified quality limits.	Same as 5517A except T.S. 185,000 psi min. Y.S. 140,000 psi min. Extension under load .0148" in 2". Elong. in 2" 8% min. thicknesses up to .015" and 9% min. thicknesses over .015".	

AMS—	COMPOSITION										FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Ni	Cr	Cu	Iron	Cb			
5540A Issued 1/23/40 Revised 11/1/41	.15 max.	1.00 max.	..	..	.50 max.	75.00 min.	12.00 / 15.00	.50 max.	9.00 max.	..	Corrosion & heat resistant cold rolled sheet & strip.	Uniform, within specified quality limits.	Cold rolled annealed T. S. 80,000-100,000 psi., Y. S. 30,000 psi. min. Extension under load .0069" in 2" Elong. in 2" 35% min. when pulled at rate .05" per minute. Y. S. Elong. not required for sheet or strip under .020" in thickness. Bend test requirements.
5570C Issued 12/4/39 Revised 12/1/42	.10 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	.50 max.	..	8xC min. or Ti 4xC min.	Corrosion & heat resistant seamless tubing.	Uniform, within specified quality limits.	Solution heat treated (Completely austenitic annealed) and pickled T. S. 100,000 psi max. & Elong. 35% min. in 2", strip or 40% min. in 2", full section when pulled at rate .05" per minute. Swaging test & embrittlement test requirements.
5575B Issued 11/1/41 Revised 12/1/42	.10 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	.50 max.	..	8xC min. or Ti 4xC min.	Corrosion & heat resistant welded tubing.	Uniform, within specified quality limits.	Same as 5570B plus hydrostatic pressure test requirements.
5580A Issued 12/4/39 Revised 11/1/41	.15 max.	1.00 max.	..	..	.50 max.	75.00 min.	12.00 / 15.00	.50 max.	9.00 max.	..	Corrosion & heat resistant seamless tubing.	Uniform, within specified quality limits.	Cold drawn, annealed. T. S. 105,000 psi max.—80,000 psi min. Y. S. 30,000 psi min. & elong. 35% in 2" min. When pulled at rate of .05" per min. Swaging test requirements.

AMS-	COMPOSITION										FORM	QUALITY	CONDITION
	C	Mn	P	S or Se	Si	Ni	Cr	Mo	Se				
5610A Issued 12/4/39 Revised 6/1/42	.15 max.	1.20 max.	.04 max.	.18 / .35	.75 max.	..	12.00 / 14.00	.60 max.	..	Corrosion resistant bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Bars and forgings free machining quality 187-241 B.H.N. Other forms see spec. Either sulphur or selenium may be used.	
5613A Issued 12/4/39 Revised 6/1/42	.10 / .15	1.25 max.	.04 max.	.04 max.	.50 max.	1.25 / 2.25	11.50 / 13.50	..	..	Corrosion resistant bars, billets, forgings or as ordered.	Uniform, within specified quality limits. Subject to Magnetic Insp.	Bars and forgings in best condition for machining 207-255 B.H.N. Other forms see spec. Hardenability and magnaflux requirements.
5630A Issued 12/4/39 Revised 6/1/42	1.00 / 1.10	.60 max.	.04 max.	.04 max.	.50 max.	..	16.5 / 18.0	.40 / .60	..	Corrosion resistant —High Carbon bars, billets, forgings or as ordered.	Uniform, within specified quality limits. Subject to Magnetic Insp.	Forgings and bars in the best condition for machining 255 B.H.N. max. unless otherwise ordered. Other forms see spec. Hardenability and Magnaflux requirements.	
5632 Issued 6/1/42	1.00 / 1.10	.60 max.	.04 max.	.04 max.	.50 max.	..	16.50 / 18.00	.40 / .60	.10 / .20	Corrosion resistant free machining high carbon bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Forgings and bars in the best condition for machining 255 B.H.N. max. unless otherwise ordered. Other forms see spec. Hardenability requirements.	
5640A Issued 12/4/39 Revised 6/1/42	Type #1 .15 max. Type #2 .15 max.	.20 / 2.50 .20 / 2.50	.04 max. .12 max.	.18 / .35 .04 max.	.20 / 1.50 .20 / 1.50	7.00 / 10.00 7.00 / 10.00	17.00 min. 17.00 min.	.75 max. ..	.. / .15 / .35	Corrosion resistant —free machining bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Bars and Forgings free from continuous carbide network 160-241 B.H.N. Other forms see spec.
Unless otherwise specified either type #1 or type #2 may be supplied.													

AMS-	COMPOSITION											FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Ni	Cr	Iron	Cu	Se	Cb			
5641 Issued 6/1/42	.12 max.	2.00 max.	.15 max.	.10 max.	.70 max.	8.00 / 12.00	17.00 / 20.00	..	..	.15 / .30	..	Corrosion resistant swaging or hot upsetting type bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Bars and forgings free from continuous carbide network. Bars and billets except those intended for forgings T. S. 75,000-115,000 psi and elong. in 2" shall be min. 35%. Other forms see spec.
5645B Issued 12/4/39 Revised { 11/1/41 6/1/42	.10 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	..	.50 max.	..	8xC min. or Ti 4xC min.	Corrosion & heat resistant bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Bars & forgings solution heat treated (completely austenitic annealed) and free from continuous carbide network 149-228 B.H.N. Other forms see spec. Embrittlement test requirements.
5665 Issued 10/15/40	.15 max.	1.00 max.	..	..	.50 max.	75.00 min.	12.00 / 15.00	9.00 max.	.50 max.	..	..	Nickel, chrome, iron bars, billets, forgings or as ordered.	Uniform, within specified quality limits.	Bars and forgings strain relieved 149-217 B.H.N. Other forms see spec.
5680 Issued 12/4/39	.07 max.	2.50 max.	.03 max.	.03 max.	.50 / 1.00	8.00 min.	17.00 min.	..	..	Nil	.70 min.	Corrosion resisting welding wire.	Uniform, within specified quality limits.	Annealed 1/16", 3/32" or 1/8" diam. in straight lengths of 36".
5682 Issued 3/1/42	.15 / .30	.60 / 1.00	..	.03 max.	.30 max.	Re-main-der	19.00 / 21.00	1.00 max.	..	..	..	Nickel chrome coating alloy rods, wire or as ordered.	Uniform, within specified quality limits.	Hot rolled or cold drawn clean surface free from oxidation.
5683 Issued 10/15/40	.15 max.	1.00 max.	..	..	.50 max.	75.00 min.	12.00 / 15.00	9.00 max.	.50 max.	..	..	Corrosion resisting welding wire.	Uniform, within specified quality limits.	Annealed and capable of being bent cold through 180° around a diameter equal to that of wire without cracking. Unless otherwise specified 1/16", 3/32" or 1/8" diameters and in 36" straight lengths.

AMS—	COMPOSITION											FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Ni	Cr	Cu	Mo	W				
5685A Issued 12/4/39 Revised 6/1/42	.15 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	.50 max.	..	..	Corrosion resistant annealed wire.	Uniform, within specified quality limits.	Annealed, pickled, drawn or polished max. T. S. 105,000 psi. In straight lengths T. S. 120,000 psi max. Wire shall be capable of being bent flat on itself without breakage.
5688A Issued 12/4/39 Revised 6/1/42	.15 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	7.00 min.	17.00 min.	.50 max.	..	..	Corrosion resistant spring wire.	Uniform, within specified quality limits.	Spring temper cold drawn. Must have definite physical properties as set forth by spec. ranging in tensile strength from 255,000 psi to 180,000 psi depending on diameter of wire.
5690A Issued 12/4/39 Revised 6/1/42	.10 max.	.20 / 2.50	.04 max.	.04 max.	.20 / 1.50	10.00 / 14.00	16.00 / 18.00	.50 max.	2.00 / 3.00	..	Corrosion resistant cold drawn wire or cold drawn wire screening.	Uniform, within specified quality limits.	Annealed and free from continuous carbide network and must be capable of being bent flat on itself without cracking.	
5700 Issued 3/14/40	.40 / .50	.70 max.	.03 max.	.03 max.	.30 / .80	13.00 / 15.00	13.00 / 15.00	..	.20 / .50	1.75 / 3.00	Alloy valve steel bars, billets, forgings or as ordered.	Highest quality. See spec. for Special requirements.	Bars and forgings normalized to produce a uniform, refined structure in a machinable condition. Other forms see spec.	

3705 Issued 1/1/42	.25 / .40	.65 max.	.03 max.	.03 max.	2.0 / 3.0	7.0 / 9.0	11.5 / 14.0	..	..	..	Alloy valve steel bars, billets, forgings or as ordered.	Highest quality. See spec. for special requirements.	Bars and forgings normalized to produce uniform, refined structure in a machinable condition. Other forms see spec.
5710 Issued 1/1/42	.76 / .86	.20 / .60	.03 max.	.03 max.	1.9 / 2.6	1.0 / 1.6	19.0 / 21.0	..	..	..	Alloy valve steel bars, billets, forgings or as ordered.	Highest quality. See spec. for special requirements.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec.
6240B Issued 12/4/39 Revised (11/1/41) (1/15/42)	.09 / .14	.45 / .60	.04 max.	.04 max.	.20 / .35	4.75 / 5.25	..	..	..	..	Carburizing alloy steel bars, billets, forgings or as ordered.	Aircraft quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. Hardenability test requirements.
6242B Issued 1/23/40 Revised (11/1/41) (3/1/42)	.15 / .20	.45 / .60	.04 max.	.04 max.	.20 / .35	4.75 / 5.25	..	..	..	..	Carburizing alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. Hardenability test requirements.
AMS-	COMPOSITION								FORM		QUALITY	CONDITION	
	C	Mn	P	S	Si	Ni	Cr	Mo					
6250C Issued 12/4/39 Revised 12/1/42	.08 / .13	.30 / .60	.04 max.	.04 max.	.20 / .35	3.25 / 3.75	1.25 / 1.75	..	Carburizing alloy steel bars, billets, forgings or as ordered. (Light section.)	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6252C Issued 6/13/40 Revised 12/1/42	.08 / .13	.30 / .60	.04 max.	.04 max.	.20 / .35	3.25 / 3.75	1.25 / 1.75	..	Carburizing alloy steel bars, billets, forgings or as ordered. (Heavy sections.)	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6253C Issued 6/13/40 Revised 12/1/42	.11 / .16	.30 / .60	.04 max.	.04 max.	.20 / .35	3.25 / 3.75	1.25 / 1.75	..	Carburizing alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability test requirements.		
6254C Issued 12/4/39 Revised 12/1/42	.14 / .19	.30 / .60	.04 max.	.04 max.	.20 / .35	3.25 / 3.75	1.25 / 1.75	..	Carburizing alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability test requirements.		
6260 Issued 9/1/42	.08 / .13	.70 / .90	.04 max.	.04 max.	.20 / .35	2.0 / 2.50	.80 / 1.10	.30 / .40	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability test requirements.		
6262 Issued 9/1/42	.08 / .13	.70 / .90	.04 max.	.04 max.	.20 / .35	2.0 / 2.5	.80 / 1.10	.30 / .40	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6263 Issued 9/1/42	.11 / .16	.70 / .90	.04 max.	.04 max.	.20 / .35	2.0 / 2.5	.80 / 1.10	.30 / .40	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6264 Issued 9/1/42	.15 / .20	.70 / .90	.04 max.	.04 max.	.20 / .35	2.0 / 2.5	.80 / 1.10	.30 / .40	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6270 Issued 9/1/42	.12 / .17	.70 / .90	.04 max.	.04 max.	.20 / .35	.40 / .60	.40 / .06	.15 / .25	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6272 Issued 9/1/42	.15 / .20	.70 / .90	.04 max.	.04 max.	.20 / .35	.40 / .60	.40 / .60	.15 / .25	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6274 Issued 9/1/42	.18 / .23	.70 / .90	.04 max.	.04 max.	.20 / .35	.40 / .60	.40 / .60	.15 / .25	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6280 Issued 9/1/42	.27 / .33	.70 / .90	.04 max.	.04 max.	.20 / .35	.40 / .60	.40 / .60	.15 / .25	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability requirements.		
6290B Issued 12/4/39 Revised (11/1/41) (3/1/42)	.11 / .17	.45 / .60	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	..	.20 / .30	Carburizing alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability test requirements.		
6292B Issued 12/4/39 Revised (11/1/41) (3/1/42)	.15 / .20	.45 / .60	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	..	.20 / .30	Carburizing alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. hardenability test requirements.		
6294B Issued 12/4/39 Revised (11/1/41) (3/1/42)	.17 / .22	.45 / .60	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	..	.20 / .30	Carburizing alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise specified. Other forms see spec. hardenability test requirements.		
6310A Issued 12/4/39 Revised 3/1/42	.33 / .38	.60 / .80	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	..	.20 / .30	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise specified. Other forms see spec. Surface decarburization limitation and special surface finish requirements.		
6312A Issued 12/4/39 Revised 3/1/42	.38 / .43	.60 / .80	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	..	.20 / .30	Alloy steel bars, billets, forgings, tubing, or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations and hardenability test requirements.		
6315A Issued 12/4/39 Revised 3/1/42	.38 / .43	.60 / .80	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	..	.20 / .30	Heat treated. Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Quenched and tempered Min. physicals T. S. 105,000 psi. Elong. 17% in 2". 55% Red. of Area and each piece 223-262 B. H. N. Properties apply to 1" section and less, if larger sizes are ordered it will be necessary to modify properties. Other forms see spec.		

AMS-	COMPOSITION								FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Ni	Cr	Mo			
6317A Issued 12/4/39 Revised 3/1/42	.38 /.43	.60 /.80	.04 max.	.04 max.	.20 /.35	1.65 /2.00	..	.20 /.30	Heat treated. Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Quenched and tempered. Min. physicals T. S. 125,000 psi Elong. 16% in 2", 50% Red. of Area and each piece 262-311 B. H. N. Properties apply to 1" section and less, if larger sizes are ordered it will be necessary to modify properties. Other forms see spec.
6320 Issued 9/1/42	.33 /.38	.75 /1.00	.04 max.	.04 max.	.20 /.35	.40 /.60	.40 /.60	.20 /.30	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. For other forms see spec. Surface decarburization limitations.
6322 Issued 9/1/42	.38 /.43	.75 /1.00	.04 max.	.04 max.	.20 /.35	.40 /.60	.40 /.60	.20 /.30	Alloy steel bars, billets, forgings, or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. For other forms see spec. Surface decarburization and hardenability requirements.
6325 Issued 9/1/42	.38 /.43	.75 /1.00	.04 max.	.04 max.	.20 /.35	.40 /.60	.40 /.60	.20 /.30	Heat treated. Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars quenched and tempered min. physicals T. S. 105,000 psi Elong. 17% in 2", Red. of Area 55% and each piece 223-262 B. H. N. The properties apply to sections 1" & less. If larger sizes are ordered it will be necessary to modify the properties. For other forms see spec.
6327 Issued 9/1/42	.38 /.43	.75 /1.00	.04 max.	.04 max.	.20 /.35	.40 /.60	.40 /.60	.20 /.30	Heat treated. Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars quenched and tempered. Min. physicals T. S. 125,000 psi Elong. 16% in 2", Red. of Area 50% and each piece 262-311 B. H. N. Properties apply to 1" section & less, if larger sizes are ordered it will be necessary to modify properties. Other forms see spec.
6330A Issued 12/4/39 Revised 3/1/42	.33 /.38	.60 /.80	.04 max.	.04 max.	.20 /.35	1.10 /1.40	.55 /.75	..	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.
6332 Issued 12/4/39	.40 /.45	.60 /.90	.04 max.	.05 max.	..	1.00 /1.50	.45 /.75	..	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B. H. N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.
6335 Issued 12/4/39	.35 /.45	.60 /.90	.04 max.	.05 max.	..	1.00 /1.50	.45 /.75	..	Heat treated. Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Quenched and tempered. Min. physicals T. S. 105,000 psi Elong. 17% in 2", 55% Red. of Area and each piece 223-262 B. H. N. Properties apply to 1" section and less, if larger sizes are ordered it will be necessary to modify properties. Other forms see spec.
6337 Issued 3/13/40	.35 /.45	.60 /.90	.04 max.	.05 max.	..	1.00 /1.50	.45 /.75	..	Heat treated. Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Quenched and tempered. Min. physicals T. S. 125,000 psi, Elong. 16% in 2", 50% Red. of Area and each piece 262-311 B. H. N. Properties apply to 1" section and less, if larger sizes are ordered it will be necessary to modify properties. Other forms see spec.
6350 Issued 12/1/42	.27 /.33	.40 /.60	.04 max.	.04 max.	.20 /.35	..	.80 /1.10	.15 /.25	Alloy steel plate, sheet and strip.	Aircraft Quality.	Cold finished and clean annealed, unless otherwise ordered, to max. T. S. 80,000 psi. Bend test, surface decarburization, and hardenability requirements.
6352A Issued 12/4/39 Revised 12/1/42	.32 /.39	.40 /.60	.04 max.	.04 max.	.20 /.35	..	.80 /1.10	.15 /.25	Alloy steel plate, sheet and strip.	Aircraft Quality.	Cold finished and clean annealed unless otherwise ordered to max. T. S. 85,000 psi. Bend test, surface decarburization, and hardenability requirements.
6355 Issued 9/1/42	.27 /.33	.70 /.90	.04 max.	.04 max.	.20 /.35	.40 /.60	.40 /.60	.15 /.25	Alloy steel plate, sheet and strip.	Aircraft Quality.	Cold finished and clean annealed, unless otherwise ordered to max. T.S. of 80,000 psi. Hardenability test, bend test and surface decarburization limitations.
6357 Issued 9/1/42	.33 /.38	.75 /1.00	.04 max.	.04 max.	.20 /.35	.40 /.60	.40 /.60	.20 /.30	Alloy steel plate, sheet and strip.	Aircraft Quality.	Cold finished and clean annealed, unless otherwise ordered to max. T. S. of 80,000 psi. Hardenability test, bend test, and surface decarburization limitations.
6359 Issued 12/1/42	.35 /.40	.60 /.80	.04 max.	.04 max.	.20 /.35	1.65 /2.00	.70 /.90	.20 /.30	Alloy steel plate, sheet and strip.	Aircraft Quality.	Unless otherwise ordered the material in the hot rolled and annealed condition (Rockwell C-25 max). When normalized condition is ordered Rockwell C-30 max. Bend test and surface decarburization limitations.
6360A Issued 12/4/39 Revised 6/1/42	.27 /.33	.40 /.60	.04 max.	.04 max.	.20 /.35	..	.80 /1.10	.15 /.25	Alloy steel normalized seamless tubing.	Aircraft Quality.	Normalized, then stress relieved if cold worked after normalizing to definite physicals unless otherwise ordered. Physicals as outlined by spec. vary with wall thickness.
6361 Issued 6/1/42	.27 /.33	.40 /.60	.04 max.	.04 max.	.20 /.35	..	.80 /1.10	.15 /.25	Alloy steel heat treated, Seamless Rd. tubing .188 max. wall.	Aircraft Quality.	Quenched in oil unless otherwise agreed and tempered. Min. physicals T. S. 125,000 psi, Y. S. (.2% set) 100,000 psi. (Equiv. extension under load .0107" in 2") Elong. 12% in 2" in full tube and 7% in 2" in strip.
6362 Issued 6/1/42	.27 /.33	.40 /.60	.04 max.	.04 max.	.20 /.35	..	.80 /1.10	.15 /.25	Alloy steel heat treated seamless Rd. tubing .188 max. wall.	Aircraft Quality.	Quenched in oil unless otherwise agreed and tempered min. physicals T.S. 150,000 psi, Y. S. (.2% set) 135,000 psi. (Equiv. extension under load .013" in 2") Elong. 10% in 2" in full tube and 6% in 2" in strip.

AMS-	COMPOSITION							FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Cr	Mo			
6363 Issued 6/1/42	.27 / .33	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel heat treated seamless Rd. tubing .156 max. wall.	Aircraft Quality.	Quenched in oil unless otherwise agreed and tempered. Min. physical properties T. S. 180,000 psi Y. S. (.2% set) 165,000 psi (Equiv. extension under load .015" in 2") Elong. 8% in 2" in full tube and 5% in 2" in strip.
6365 Issued 6/1/42	.32 / .39	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel normalized seamless Rd. tubing.	Aircraft Quality.	Normalized, then stress relieved if cold worked after normalizing to definite min. physicals unless otherwise ordered. Physicals as outlined by spec. vary with wall thickness.
6366 Issued 6/1/42	.32 / .39	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel heat treated seamless Rd. tubing.	Aircraft Quality.	Quenched in oil unless otherwise agreed and tempered min. physicals T. S. 125,000 psi Y. S. (.2% set) 100,000 psi (Equiv. extension under load .0107" in 2"). Elong. 12% in 2" in full tube and 7% in 2" in strip.
6367 Issued 6/1/42	.32 / .39	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel heat treated seamless Rd. tubing.	Aircraft Quality.	Quenched in oil unless otherwise agreed and tempered min. physicals T. S. 150,000 psi Y. S. (.2% set) 135,000 psi (Equiv. extension under load .013" in 2"). Elong. 10% in 2" in full tube and 6% in 2" in strip.
6368 Issued 6/1/42	.32 / .39	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel heat treated seamless Rd. tubing.	Aircraft Quality.	Quenched in oil unless otherwise agreed and tempered min. physicals T. S. 180,000 psi Y. S. (.2% set) 165,000 psi (Equiv. extension under load .015" in 2" elong. 8% in 2" in full tube and 5% in 2" in strip.
6369 Issued 6/1/42	.32 / .39	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel heat treated seamless Rd. tubing.	Aircraft Quality.	Quenched in oil unless otherwise agreed and tempered min. physicals T. S. 200,000 psi Y. S. (.2% set) 165,000 psi (Equiv. extension under load .015" in 2" Elong. 7% in 2" in full tube and 4% in 2" in strip.
6370A Issued 12/4/39 Revised 3/1/42	.27 / .33	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in machinable condition 229 B.H.N. max. unless otherwise ordered. Other forms see spec. surface de- carburation limitations.
6371 Issued 12/1/42	.27 / .33	.40 / .60	.04 max.	.04 max.	.20 / .35	.80 / 1.10	.15 / .25	Alloy steel tubing hot or cold finished seamless.	Aircraft Quality.	Unless otherwise ordered in annealed condition (Rockwell B-95 max.) when normalized condition is ordered Rockwell C-27 max.

AMS-	COMPOSITION									FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Ni	Cr	Mo	Va			
6380A Issued 12/4/39 Revised 3/1/42	.35 / .42	.70 / .90	.04 max.	.04 max.	.20 / .35	..	.80 / 1.10	.15 / .25	..	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 255 B.H.N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.
6381 Issued 12/1/42	.35 / .42	.70 / .90	.04 max.	.04 max.	.20 / .35	..	.80 / 1.10	.15 / .25	..	Alloy steel tubing hot or cold finished seamless.	Aircraft Quality.	Unless otherwise ordered in the annealed condition (Rockwell C-20 max.). When normalized condition is ordered Rockwell C-30 max.
6382A Issued 12/4/39 Revised 3/1/42	.38 / .43	.75 / 1.00	.04 max.	.04 max.	.20 / .35	..	.80 / 1.10	.15 / .25	..	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B.H.N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.
6410 Issued 6/13/40	.26 / .31	.30 / .50	.04 max.	.05 max.	..	1.65 / 2.00	.60 / .90	.20 / .30	..	Alloy steel bars, billets, forgings, tubing or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B.H.N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.
6412A Issued 1/23/40 Revised 3/1/42	.35 / .40	.60 / .80	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	.70 / .90	.20 / .30	..	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B.H.N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.
6413 Issued 12/1/42	.35 / .40	.60 / .80	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	.70 / .90	.20 / .30	..	Alloy steel tubing. Hot or cold finished seamless.	Aircraft Quality.	Unless otherwise ordered in the annealed condition (Rockwell C-25 max.) When normalized condition is ordered Rockwell C-30 max.
6415A Issued 1/23/40 Revised 6/1/42	.38 / .43	.60 / .80	.04 max.	.04 max.	.20 / .35	1.65 / 2.00	.70 / .90	.20 / .30	..	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B.H.N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.
6440 Issued 12/4/39	.95 / 1.10	.20 / .50	.03 max.	.035 max.	..	..	1.20 / 1.50	..	..	Alloy steel bars, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 170-205 B.H.N. Microstructure to be controlled and decarburization limitations. Other forms see spec.
6448 Issued 3/1/42	.48 / .55	.65 / .90	.04 max.	.04 max.	.20 / .35	..	.80 / 1.10	..	.15 min.	Alloy steel bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 235 B.H.N. max. unless otherwise ordered. Other forms see spec. Surface decarburization limitations.

AMS-	COMPOSITION									FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Ni	Cr	Al	Mo			
6450 Issued 11/1/41	.47 / .55	.60 / .90	.03 max.	.03 max.	.12 / .30	..	.80 / 1.10	..	Va.15 / .25	Alloy steel cold finished spring wire rods and other shapes.	Aircraft Quality.	Uniformly annealed and cold drawn sufficiently to meet purchasers spring coiling requirements. Microstructure, surface decarburization, bend test and hardenability requirements.
6455A Issued 12/4/39 Revised 3/1/42	.48 / .55	.65 / .90	.04 max.	.04 max.	.20 / .35	..	.80 / 1.10	..	Va.15 min.	Alloy spring steel cold finished sheet and strip.	Aircraft Quality.	Unless otherwise ordered shall be fully annealed, bend test and surface decarburization limitations.
6470A Issued 12/4/39 Revised 12/1/42	.38 / .45	.40 / .70	.04 max.	.05 max.	.20 / .40	..	1.40 / 1.80	.90 / 1.35	.30 / .45	Nitriding alloy bars, billets, forgings or as ordered.	Aircraft Quality.	Bars in a machinable condition 229 B.H.N. max. unless otherwise ordered. Other forms see spec. Nitriding requirements.

MATERIAL SPECIFICATIONS

AMS-	COMPOSITION									FORM	QUALITY	CONDITION
	C	Mn	P	S	Si	Ni	Cr	As	Mo			
6310 Issued 6/1/42	.27 / .33	.40 / .60	.04 max.	.04 max.	.20 / .35	..	.80 / 1.10	..	.15 / .25	Alloy steel normal- ized welded tub- ing.	Aircraft Quality.	Normalized, then stress relieved if cold worked after normalizing to definite min. physical prop- erties, unless otherwise ordered. Physicals out- lined by the spec. and vary with the wall thickness.
6330 Issued 9/1/42	.27 / .33	.70 / .90	.04 max.	.04 max.	.20 / .35	.40 / .60	.40 / .60	..	.15 / .25	Alloy steel normal- ized seamless Rd. tubing.	Aircraft Quality.	Normalized, then stress relieved if cold worked after normalizing to definite min. physical prop- erties, unless otherwise ordered. Physicals as outlined by the spec. and vary with the wall thickness.
6333 Issued 9/1/42	.33 / .38	.75 / 1.00	.04 max.	.04 max.	.20 / .35	.40 / .60	.40 / .60	..	.20 / .30	Alloy steel normal- ized seamless Rd. tubing.	Aircraft Quality.	Normalized, then stress relieved if cold worked after normalizing to definite min. physical prop- erties, unless otherwise ordered. The physicals as outlined by the spec. and vary with the wall thickness.

ARMY-NAVY AERONAUTICAL SPECIFICATIONS (Condensed)

AN-S specifications generally contain specific restrictions on size tolerances, magnetic inspection, hardenability, annealed hardness, bending, macrostructure, reports, packing, etc.—every detail of which is important for compliance with the specification. The following outline is a condensed table of what to consider the essential qualifications needed to identify these specifications. Complete AN-S or AN-T specifications may be obtained from the Aircraft Scheduling Unit of the Aircraft Pro-
duction Board at Dayton, Ohio, or at Washington, D. C.

AN NUMBER DATE	ANALYSIS								FORM	QUALITY	CONDITION See Note I	SURFACE See Note II	Nearest Corresponding Commercial Analysis. See Note III
	C	M	Max. P	Max. S	Si	Cr	Ni	Mo					
AN-S-4 Issued 4/1/42	.30 / .40	.60 / .90	.04	.05	..	..	..	..	Bar & Rod	Aircraft	A-B or C as specified.	1-2-3-4 or 5 as specified.	AISI C1035
AN-S-8 Issued 3/28/42	.90 / 1.05	.30 / .50	.04	.05	..	..	..	..	Bar & Rod	Aircraft	A-B or C as specified.	1-2-3-4 or 5 as specified.	AISI C1095
AN-S-9 Issued 5/5/42 Amend. 10/15/42	.35 / .40	.75 / 1.00	.04	.04	.20 / .35	..	..	.20 / .30	Bar & Rod	Aircraft	A-B-C-D-E or F as specified.	1-2-3-4 or 5 as specified.	AISI 4037
AN-S-11 Issued 6/11/42	.15 / .25 / .20 / .30	.30 / .60 / .60	.045 / .045	.055 / .055	Either analysis is acceptable unless otherwise specified.				Cold rolled sheet & strip.	Special	Physical and bend test limits.	Cold rolled.	AISI C1020 or AISI C1025
AN-S-12 Issued 11/13/42	.27 / .33	.70 / .90	.04	.04	.20 / .35	.40 / .60	.40 / .60	.15 / .25	Sheet & strip.	Special	Physical and bend test limits.	Hot Rolled or Cold Rolled, Oiled.	NE 8630
AN-S-13 Issued 7/22/42	.18 / .23	.70 / .90	.04	.04	.20 / .35	.40 / .60	.40 / .60	.15 / .25	Bar & Rod.	Aircraft	A-B-C-D-E or F as specified.	1-2-3-4 or 5 as specified.	NE 8620
AN-S-14 Issued 7/22/42	.27 / .33	.70 / .90	.04	.04	.20 / .35	.40 / .60	.40 / .60	.15 / .25	Bar & Rod.	Aircraft	A-B-C-D-E or F as specified.	1-2-3-4 or 5 as specified.	NE 8630
AN-S-15 Issued 7/22/42	.33 / .38	.75 / 1.00	.04	.04	.20 / .35	.40 / .60	.40 / .60	.20 / .30	Bar & Rod.	Aircraft	A-B-C-D-E or F as specified.	1-2-3-4 or 5 as specified.	NE 8735
AN-S-16 Issued 7/22/42	.38 / .43	.75 / 1.00	.04	.04	.20 / .35	.40 / .60	.40 / .60	.20 / .30	Bar & Rod.	Aircraft	A-B-C-D-E or F as specified.	1-2-3-4 or 5 as specified.	NE 8740
AN-S-19 Comp. A Issued 10/3/42	.38 / .45	.40 / .70	.04	.05	.50 max.	1.40 / 1.80	AL.90 / 1.35	.30 / .45	Bar & Rod for Nitriding.	Aircraft	A-B-C-D-E or F as specified.	1-2-3-4 or 5 as specified.	
High Core Strength.	.30 / .40	.50 / 1.10	.04	.06	.50 max.	1.00 / 1.50	AL.75 / 1.50 Se .15 / .35	.15 / .25					
Comp. B													
Free Machining													
AN-S-22 Issued 11/24/42 Amend. 1/11/43	.33 / .38	.75 / 1.00	.04	.04	.20 / .35	.40 / .60	.40 / .70	.20 / .30	Sheet & Strip.	Special	Physical and Bend test limits.	Cold Rolled.	NE 8735
AN-T-3 Issued 3/25/42	.25 / .35	.40 / .60	.04	.05	..	.80 / 1.10	..	.15 / .25	Welded Cr-Mo Tubing.	Special	Annealed Normalized or Heat Treated as specified.	Special See Specification.	AISI A4130
AN-T-4 Issued 4/1/42 Amend. 6/20/42	.20 / .30	.30 / .60	.045	.055	..	..	..	..	Welded Carbon Steel Tubing.	Special	Specified Physicals.	Special See Specification.	AISI C1025
AN-T-18 Issued 12/2/42	.27 / .33	.70 / .90	.04	.04	.20 / .35	.40 / .60	.40 / .60	.15 / .25	Seamless Cr-Ni-Mo Tubing.	Aircraft	Specified Physicals.	Special See Specification.	NE 8630
AN-T-22 Issued 12/1/42	.33 / .38	.75 / 1.00	.04	.04	.20 / .35	.40 / .60	.40 / .60	.20 / .30	Seamless Cr-Ni-Mo Tubing.	Aircraft	Specified Physicals.	Special See Specification.	NE 8735

Note I

Condition

- (A) as forged (B) as rolled
(C) annealed (D) normalized
(E) normalized and tempered
(F) hardened and tempered

Note II

Surface

- (1) Black as forged or rolled
(2) Pickled or Blast Cleaned
(3) Rough turned
(4) Cold Rolled or Cold Drawn
(5) Surface ground

Note III

The nearest commercial analyses are given for general information. While these analyses may check with the specified analyses it must not be assumed that the steel will meet all the other requirements of the AN Specifications.

Quench—Straightening of Armor Plate

QUENCHING and straightening of armor plate has now been combined into one successful operation at Ford Motor Co., and along with the elimination of "bugs" from the job, time required has been reduced to as little as 2 or 3 min., depending on the gage of steel involved. The method is not entirely new, but it is said to be the first time that it has ever been applied to plates or other steel of the size or thickness handled.

Plates come from the heating furnaces into presses made by Hydraulic Press Mfg. Co. at a temperature of about 1650 deg. F. The surfaces of the press dies, measuring 5 by 20 ft., somewhat resemble a waffle plate, being dotted with hollow metal pads, each approximately 2 in. in diameter and about 3 in. in depth. By linear measurement the pads cover only about 10 per cent of the plate surface when they are applied.

Each pad is drilled with three to six holes. Water is sprayed through these holes at a rate of about 700 gal. per min. for each of the paired dies, cooling the plate in less than 2 min. to a level well below 1000 deg. F., the critical point, and generally down around the 500 to 600 deg. level. At the same time the pads act to prevent any buckling or warping of the plate, so when it emerges from the press it is true, ready to go on to the draw furnaces to complete the cycle of heat treatment.

Down time for the presses has been reduced to a very minimum with these "waffle die" installations. Both top and bottom dies consist of four sections, so that if any single pad breaks off or other irregularity develops only one section needs to be removed and replaced.

Each pad is hollow so that the small sections of the plate covered by them are quenched through the cool-

ing effect of the water rushing into the pads and out of the spray holes.

This hollowing of the pads is the last vestige of the platen die method which was developed at Ford last fall when simultaneous means of quenching and straightening were first sought. At that time the entire surface of hollowed dies came into contact with the hot plate, with the quenching effect deriving from water pumped through the hollow interior of the die. However, it was found that this method resulted in frequent cracking of the dies, and considerable press time was lost for repairs.

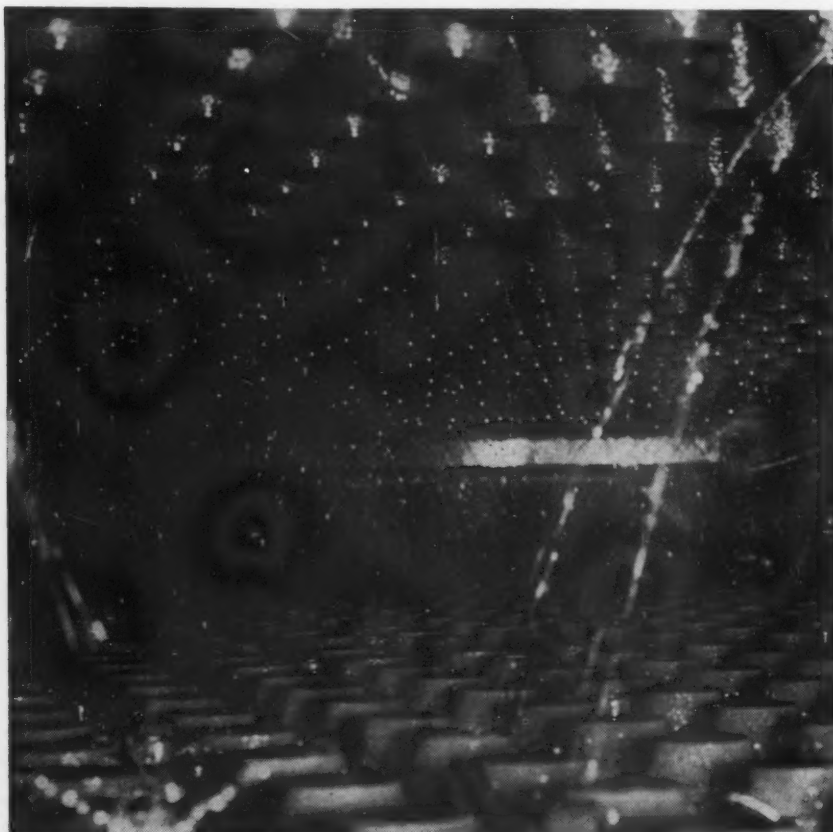
By contrast, entirely satisfactory operations are reported by Ford engineers in utilization of the waffle type dies. To date two press installations have been completed, and more will be put in as rapidly as equipment can be obtained.

Pressure of the presses required to undertake this operation is well below capacity, ranging only around 1000 tons for the thickest gages of plate put through the plant.

In order to produce armor plate of extreme battle toughness, the conventional means has generally been to heat alloy plate above its critical temperature and quench to a pre-determined hardness. The quenched structure was then transformed to the desired quality of toughness by secondary heating at reduced temperatures. However, this operation required straightening press work after the quenching which took at least two hours to complete. In addition, the procurement of a battery of straightening machines was an obvious necessity, interposing an equipment problem in effective operation of the new Ford armor plate plant.

Output in this plant, undertaken with raw material coming from the Ford steel mills, consists of shell sections for M-4 and M-10 tanks and other mechanized equipment. After completion of the heat treatment cycle the plates go to a torch cutting department which utilizes a considerable number of jig installations which make cutting as near an automatic operation as can be imagined. For the most part the flame cutters are mounted on tracks and move automatically, in line with advanced mill practice; the operator merely sets the torch at the proper point and it follows scribed lines at a pre-ordained speed and at the desired angle. By such methods volume production of tank parts was made possible much more quickly and with a considerably smaller working force than could otherwise have attained the objective.

INTERIOR area between dies on the Ford quenching-straightening press. Water is still squirting from some of the holes in the thimble-like pads of the dies as the quenched plate is withdrawn at the far end. Water fed into the dies at a rate of 1400 gal. per min. cools plate in 2 min. or less, while press pressure prevents any buckling of the plate. This eliminates need for straightening presses and time requirements running up to 8 hr. for straightening of quench-caused curling under the old quench dip method.



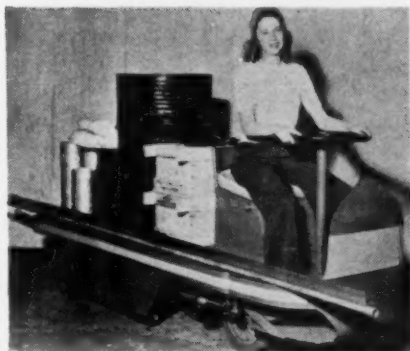
New Equipment . . .

Material Handling

Some of the more recent developments in conveying equipment, cranes, electric trucks, carriers and other material handling equipment are discussed herein.

Telescopic Lift Truck

THE new model KM30-2 center control telescopic lift tilting fork truck, made by the *Yale & Towne Mfg. Co.*, Philadelphia, has a single fork height lift of 71½ in. and additional lift reaching to 129 in. It has four speeds forward and reverse. All con-



tional automobile, with four forward and reverse speeds from 1 to 6 mi. per hr. One set of 24-volt batteries is furnished with each unit. Batteries may be recharged while the truck is idle through a built-in plug at the front, without removal.

Lift Truck Attachments

TO make possible a standard method of handling hopper-contained bulk materials in a wide variety of production operations, *Towmotor Co.*, 1226 East 152 Street, Cleveland, has developed a hopper attachment to be used on standard fork equipment. The hopper is made in various sizes and is carried directly on the fork sup-

port bar of the truck by means of a hook arrangement. Hopper gate is opened for discharge by pulling down a hand lever positioned within easy reach of the operator, while complete emptying is assured by the slanting hopper bottom. The gate is closed by gravity and is secured by an automatic catch latch.

Towmotor Corp. has also developed a new shovel type scoop which can be interchanged with standard forks for greater efficiency in picking up, carrying and dumping all types of loose bulk materials. The scoop is available in capacities from 8 to 25 cu. ft. and is manually controlled. Resetting to digging or carrying position after dumping is accomplished by lowering to floor level until spring-operated catches automatically take hold.

Fork Extension Adaptors

THE new fork extension adaptors, developed by the *Towmotor Co.*, Cleveland, are quickly and easily attached and make it possible to extend fork lengths safely as much as 24 in. Thus skids or pallets need not conform to a minimum size range to be efficiently accommodated by the same lift truck. When adaptors are held

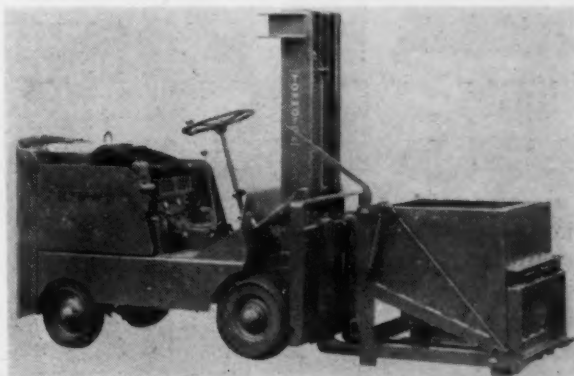
vertically, the eye at the bottom of each is inserted over forks. The adaptor is then slid back to the end of the forks and lowered. It automatically locks in position to prevent forward or backward sliding, while side flanges prevent any side-way slipping.

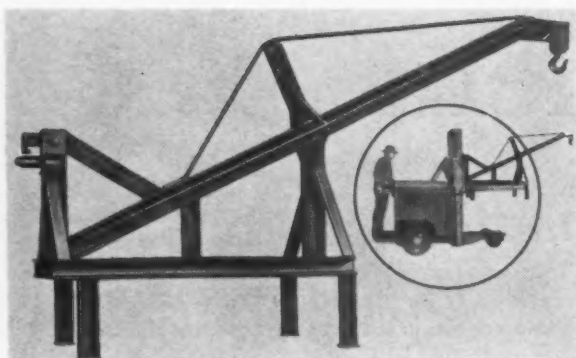


controls are in easily accessible positions and the hoisting and tilting controls are fitted with mechanical limit safety stops. The operator is placed in the center of the truck chassis frame in a protected position with perfect visibility in all directions.

Electric Platform Truck

THE Blue Streak, an electric platform truck featuring an 18 sq. ft. platform of ½-ton capacity, is offered by the *Rocky Mountain Steel Products Co.*, 1346 Wall Street, Los Angeles. The unit is operated like a conven-





Boom Skid

INDUSTRIAL trucks now in use may readily be converted into boom trucks by installing a boom skid recently designed by the *Palmer-Shile Co.*, 784 South Harrington Street, Detroit. Applied to either high lift or fork trucks, this boom skid is capable of picking up and moving heavy objects of any weight load allowed by the truck balance. The boom measures 114 in. long overall, the base being 54 in., and the boom extending 60 in. beyond the base.

Plastic Tire Treads

TREADS molded from a Monsanto plastic are now replacing rubber tires on wheeled restaurant equipment and industrial hand trucks manufactured by *Jarvis & Jarvis, Inc.*, Palmer, Mass. Although less resilient and noisier than rubber, the plastic treads roll easier over smooth or rough surfaces and are easier to attach to a wheel. The plastic used is Monsanto Chemical Co.'s Resinox, a phenol-formaldehyde compound. The largest wheel equipped to date with plastic treads measures 10 in. in diameter.



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Steel Swivel Caster

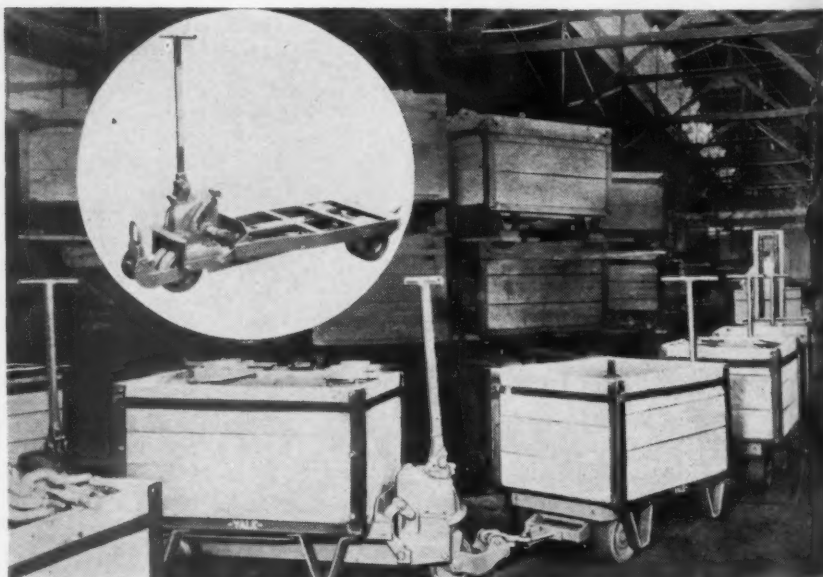
A HEAVY duty steel swivel caster is announced by the *Rose Mfg. Co.*, 12400 Strathmoor, Detroit. Featured in its design are a drop forged base plate with king pin integral. Around the king pin is a Timken thrust bearing. On the axle is a hardened non-



turning spanner bushing and a Hyatt roller wheel bearing. The caster swivels on $\frac{3}{8}$ in. chrome steel ball bearings that ride in removable steel races.

Hand Lift Truck

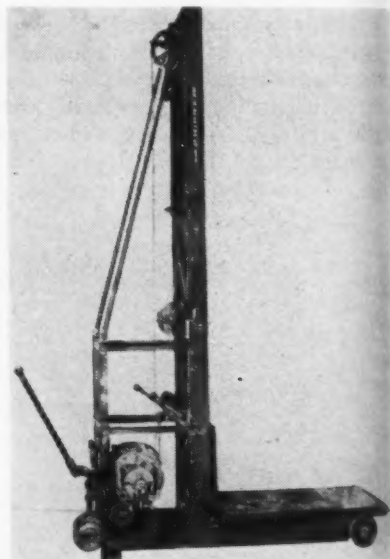
WHEN not operating as a trailer, the Load King, offered by the *Yale & Towne Mfg. Co.*, Philadelphia, functions as a conventional type hand lift truck. To connect train formations, the operator pushes the trucks together. Front end coupler loop



slides through jaw ends of the other truck coupler, pushing up the latch which automatically drops into locked position and the train is formed. To break the train, the operator steps on the pedal pad of the latch casting and the trailers are disconnected. The truck elevates the full load by a few strokes on the truck handle and deposits the entire platform load whenever needed by a simple treadle action.

Air Power Stacker

THE *Lewis-Shepard Sales Corp.*, 600 Walnut Street, Watertown, Mass., is now featuring its air power stacker, a portable elevator for use in connection with various operations. Powered by an air motor, this stacker



will operate efficiently at the same air pressure and volume as industrial overhead air hoists. Precise control

of the stacker platform is at the operator's fingertips. A cable control stops the air motor and platform when the operator removes his hand from either one of the dual hold-over controls. This cable control runs the entire height of the stacker and is standard equipment.

Stacking Box Carrier

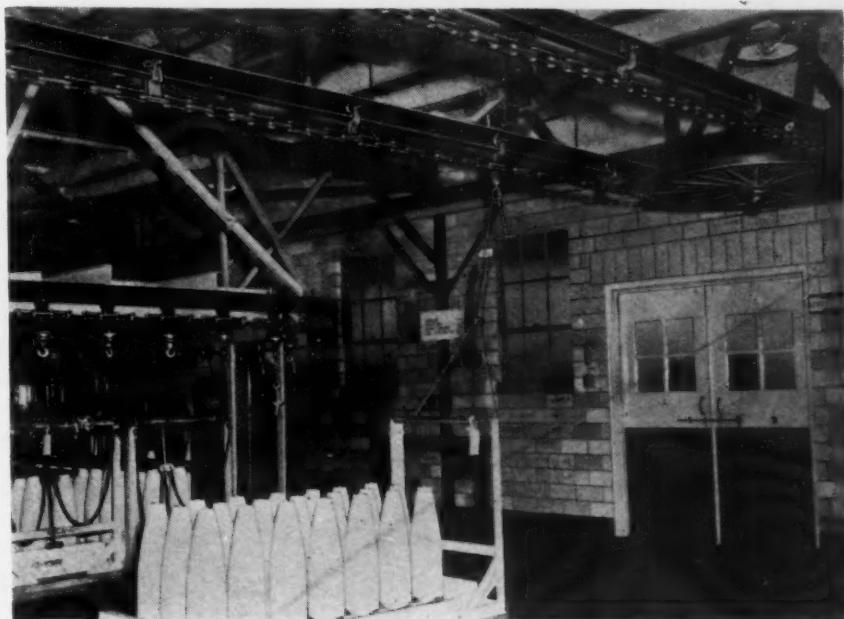
THE new heavy duty carrier offered by *Ernst Carrier Sales Co.*, 1456 Jefferson Avenue, Buffalo, is designed to handle a column of self-nesting boxes of finished parts, scrap, castings and similar materials. A built-in wedge at the bottom of a lift post slides under the stack, eliminat-



ing the use of a skid. After sliding the wedge under the stack, the boxes are raised from the floor by leaning on the handle. When the handle reaches the horizontal position, it automatically locks into position. The load is 3 in. off the floor. Forward tipping or swaying is eliminated by adjustable clamp that lowers over the back edge of the top box. Side sway is eliminated by a diagonal reinforcing bar. Rated capacity of the carrier is 1500 lb.

Portable Scale

THE Dillon dynamometer, made by *W. C. Dillon & Co., Inc.*, 5410 West Harrison Street, Chicago, when attached to a crane hook as pictured, can be used as a portable scale. It requires only a few seconds to place



chain or rope around objects and hoist them for weighing. Results are accurate, and one man can easily handle the necessary work. The Dynamometer maximum hand remains at peak



load for check-back, and main indicator hand resets itself instantly when load is released so that no time is lost.

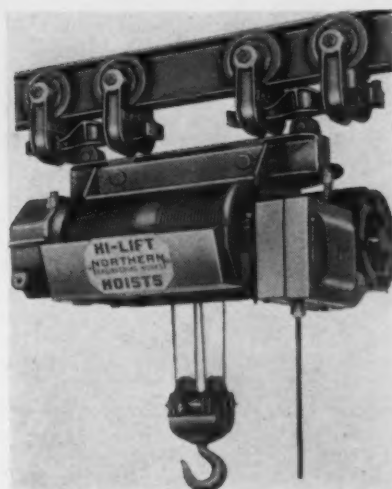
Trolley Towing Conveyor

DESIGNED to tow trucks loaded with any type of commodity, through sub-assembly and final assembly, the truck towing conveyor installation developed by the *Alvey-Ferguson Co.*, Cincinnati, eliminates the work of pushing and the danger

of sparks from electric or gasoline-operated towing equipment. Towing hooks are easily detached by hand or automatically at any predetermined location where parts carried are processed or assembled. The conveyor shown at lower elevation is equipped with swivel hooks used for conveying parts through automatic spray painting machines and drying ovens. Rotating pulley is so constructed that parts are mechanically turned during painting process.

Low Headroom Hoists

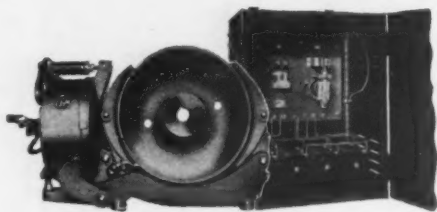
NORTHERN ENGINEERING WORKS, 2615 Atwater Street, Detroit, has announced a line of low headroom hoists for operation on the various types of special section monorail track systems. These hoists, mounted on trolleys designed to fit the the monorail track system used, have the Northern Hi-Lift design which provides maximum hook lift yet have



the drum parallel to the tramrail track, and are built in capacities from one ton up. The line includes both cab and floor controlled types.

Magnetic Brakes

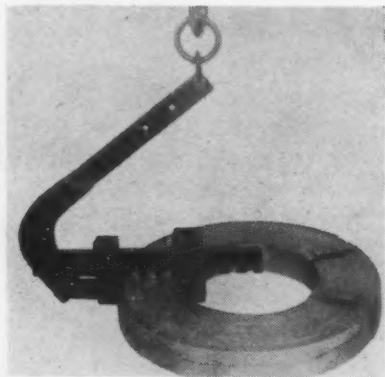
THE *Electric Controller & Mfg. Co.*, 2700 East 79 Street, Cleveland, has made its type WB brake for



d.c. service available for operation on a.c. circuits by the addition of a compact rectifier unit. These brakes are spring set and magnetically released, and are for use on cranes, hoists, bridges, turntables and conveyors. Fast operation of the brakes is obtained by high releasing current, the holding current being reduced by the brake relay and protective resistor as soon as the brake opens. The protective resistor is designed to decrease the holding current so that the brake coil and rectifier can remain across the line indefinitely without overheating.

Lifting Device

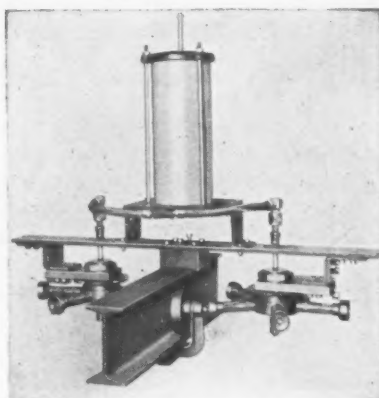
A NEW lifting device for handling coils of strip has been added to the line of the *Never-Slip Safety Clamp Co.*, 829 Mamaroneck Avenue, Mamaroneck, N. Y. This lifter is readily adjustable for a wide range of coil sizes. It is designed for handling coils in a horizontal position without first raising the coil, as no part of the lifter is underneath the coil. Brass, copper, aluminum or steel may be handled with this lifter, which can be used on any crane or hoist without the need of special equipment. Low headroom required by the lifter in-



creases storage capacity and also simplifies conveying of material from storage to presses.

Automatic Conveyor Lubricator

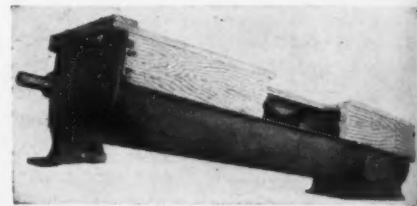
A NEW device for the automatic application of controlled volumes of lubricants, ranging from oils to heavy fibred greases, to the bearings of conveyor trolley wheels is announced by the *J. N. Fauver Co., Inc.*, Detroit. The lubricator is mounted on the trolley rail so that it simultaneously serves the bearings of each pair of wheels every time they pass this point. It starts and stops with the motion of the conveyor chain. As the trolley wheel approaches the lubricator, the hub engages the sleeve of one



of five pumping units. Continued rotation of the lubricator forces the pumping unit inward, delivering a measured quantity of lubricant through the fitting to the wheel bearing. Reservoirs of 5 or 12 lb. capacity are standard equipment.

Screw Conveyor Trough

A SCREW conveyor trough made of a combination steel trough bottom, wooden sides and wooden cover board, lag-screwed together to form a complete, tight enclosure for the screw and the material it conveys, has been developed by *Link-Belt Co.*, 2410 West 18 Street, Chicago. The trough is adapted to all screw conveyor fittings, will readily connect with existing steel trough, and can be shipped with sides



and bottom assembled. The curved bottom will be made of steel no heavier than No. 10 gage, and has the added advantage of being removable by unscrewing of the lag screws securing it to wooden trough sides, thus facilitating cleaning and replacement.

Spare Part Box

A N all-welded box has been designed by the *Stackbin Corp.*, 66 Troy Street, Providence, for manufacturers who have to ship assortments of spare parts along with the products being made for the Army and Navy. These boxes are made in a wide variety of sizes and styles to meet different requirements. Each box is made to standard Government specifications.

A similar line of boxes is offered by the *American Metal Works, Inc.*, 1506 Germantown Avenue, Philadelphia.

Special Rack Equipment

A FLEXIBLE "mass - movement" system, developed by the *Towmotor Corp.*, 1226 East 152 Street, Cleveland, has proved efficient in handling small parts from stock room to inspection, machining and assembly stations. Racks are readily removable and can be adjusted on standards to accommodate many different types of loads. Two fully-loaded racks can be picked up and safely carried by a standard fork lift truck. The caster-equipment racks are then easily rolled short distances for exact positioning at work stations.

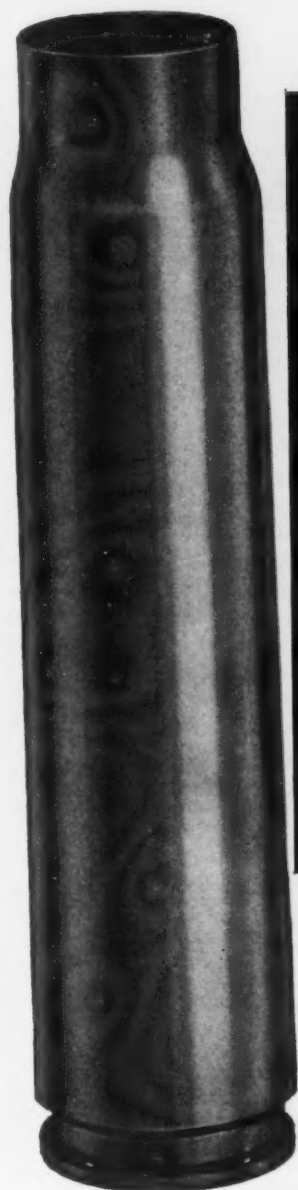
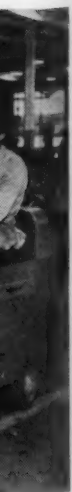


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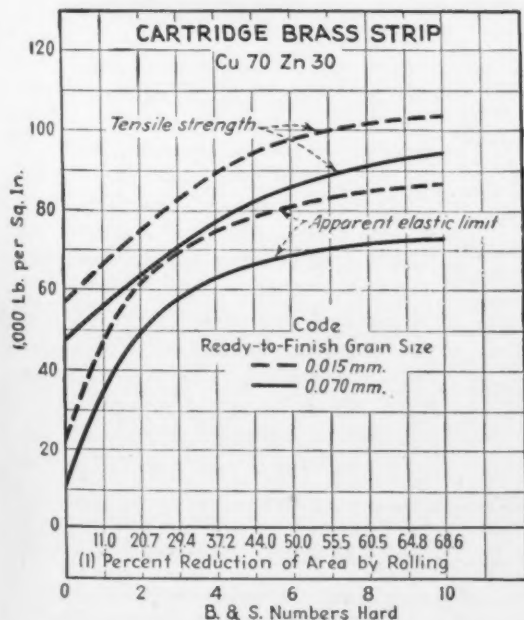


Grain size is important in CARTRIDGE BRASS

Most users of cartridge brass know that it has the most favorable combination of ductility and strength of all the brasses, that it can be readily spun, drawn, forged and upset. But many have discovered that even a metal so obliging can have a distinct "personality" of its own which has a bearing on methods of fabrication.

For example, its mechanical properties are markedly influenced by the ready-to-finish grain size — the crystal size obtained by the anneal before the final cold working operation. The chart shown here helps to illustrate the extent of this influence, and the effect of cold working, on the tensile strength and apparent elastic limit of cartridge brass strip, for the smallest and largest grain sizes commonly met in commercial annealing.

This is but a single example of the kind of information with which Revere is prepared to supply users of metals. It is one reason why persistent fabricating problems seldom trouble Revere customers. For copper-base alloys and practical help in using them, get in touch with Revere today.



As shown by this chart, control of the ready-to-finish grain size is necessary if uniform physical properties are required in the finished metal.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York

Sales Offices and Distributors in Most of America's Major Cities

Assembly Line . . .

STANLEY H. BRAMS

• Incentive pay plan augments production at Murray-Ecorse . . . Willow Run's output will be spread out to avert manpower shortages; Rouge tire plant may be used.



DETROIT—A full fledged incentive pay program appears to be developing with conspicuous success at the Ecorse plant of Murray Corp. of America. Installed in one department about two months ago and since expanded through the plant as rapidly as possible, it has brought notable increases in output at every point immediately following installation.

This division stamps and assembles military truck frames at this time, having gone into such output directly from production of frames for civilian trucks and passenger cars. Today it employs slightly less than 1000 hourly-paid men. About a third of these are directly engaged in production jobs which can be measured on a piece work basis. Nearly as many non-production workers have functions which are tied more or less directly to the production operations, and hence they also participate in the plan. About a fourth of the payroll takes no part in the program.

If the plan continues to succeed, much of the credit can be laid to a foundation of time study understanding which Murray began to build among its men some three years ago. The first major step in this program was the reaching of an agreement with the CIO United Automobile Workers Union that stewards would be elected by the men and trained in time study at the expense of the management. These men, having been trained for six or eight months, then go into the plant as "time study stew-

ards" to represent the union in disputes on the subject, to explain to the rank and file what time study means, and to help set efficiency standards. Accordingly, time study at Murray is not regarded by the men as a management device to harness them. Effort was made to set up these standards so that the 100 per cent efficiency level could be bettered about 18 per cent by a seasoned man working at his most efficient speed. Once a time standard is set for an operation it is not changed, any improvements developed by the men themselves rebounding to their own benefit.

UP until the end of last year this plant functioned at about 90 per cent efficiency as measured by the time standards. Late in 1942 an agreement was reached whereby pay raises were given the men on the understanding that plant efficiency move to the 100 per cent level. It did quite readily and held at that rate until the incentive system was installed in March. Almost instantly departmental efficiency rose to 110 per cent wherever the plan was installed and it has since moved up to around 115 per cent for the plant at large. The steady gain indicates that a level in excess of 120 per cent will be no surprise.

Actual production workers benefit in direct proportion to their increased production. If they raise output 10 per cent above the 100 per cent of expectancy level, their pay advances 10 per cent. If they could conceivably double their job standard, their pay would also double.

To provide incentive pay standards for non-production men constituted a more complex problem. Some, such as crane men, truck drivers, stock handlers, die setters and the like, do all their work in one department. The incentive pay for such workers is evolved from a formula which takes into account the added output of their own department and of the plant at large. Their incentive pay includes half the amount of bonus paid to production workers in that department, plus a proportion equal to the average production above par for the plant at large.

A second group of non-production workers are not tied up directly with any individual department, but also participate in the incentive pay benefits. These include inside truck drivers not attached to any individual department, stock handlers, car blockers, yard crane operators, packers and shippers, stock crib men, salvage men and others. Incentive pay for this group is set at one-half of the average output figure over 100 per cent for the plant at large.

To illustrate, a stock handler attached to an individual department which makes a showing 10 per cent above standard would receive a 5 per cent pay bonus. In addition, if the entire plant operated at 114 per cent of normal he would also receive half of that overage, or 7 per cent, making his total incentive pay 12 per cent of his regular rate. A stock handler not attached to any department would receive half of the plant coverage, in this case 7 per cent of his regular pay.

MOST of the Murray-Ecorse operations consist of assembly work; cooperative effort is required in such production line departments. Since the plan was instituted a new and surprising amount of teamwork has been apparent. Line rates, which of course determine output in such departments, are arranged between the management and the union time study stewards, the effort being to move them up gradually, adjusting work at bottleneck stations to make this possible.

The press department offers individual rather than group opportunity for production increases, nearly all of these jobs being turned out by two-man or four-man crews. Any down time on a press caused by lack of materials, die breakage, etc., is credited at 100 per cent of efficiency rating for its operations. Interesting is the fact that where down time is traditionally welcomed in a press shop as a means of affording a rest for the men, it is no longer welcomed at Murray-Ecorse, inasmuch as the 100 per cent credit for the down period serves

"P.A." May Mean "Procurement Agent"

• • • One of the largest automotive companies seriously is considering changing the name of its purchasing agents to "procurement agents." The thinking of this company's chief executives is that the purchasing agent has a function today not only to buy but to see that the material is obtained and delivered on time—procured, in other words.

SWENSON

went a thousand miles . . . to work for half an hour



A Short Story complete on this page

AXEL SWENSON* is a gnarled, sawed-off little Swede. He's been with Pratt & Whitney since he was a boy, and that was in the '80s.

P&W sent a jig borer out to the Red River engine plant awhile back; something had happened to it in transit, and the Martin men couldn't put it together right. They called P&W. It was a job for Axel Swenson.

A P&W jig borer, you know, is one of the things that make mass production possible. It's the world's most accurate machine tool. Its base holds the work in position; its upright column holds the tool. Theoretically, that column ought to be at right angles to the base . . . no more, no less. But of course, that's just theory.

Well, this jig borer at Martin was out of line by some three ten-thousandths of an inch per foot . . . much too big an error to suit either Pratt & Whitney or Martin. Axel was pushed into a plane and away he went, his tool bag under his arm.

Little Axel Swenson walked up to Martin's plush-lined offices and stated his business. They led him out to the machine and he went to work.

For fifteen minutes he just measured the job with instruments from his kit. Then "Hoist 'er oop," he told the man on the crane. The rope slings stretched; the column went up off the base. Axel reached over and scraped the base joint tenderly, slowly, in the place his "know how" told him to touch.

Five minutes later he stepped back. "Hokay," he told the crane man.

Martin men did the measuring this time. They turned to Axel with a gasp. "Only one ten-thousandth of an inch out!" Excited comment rose from the group like a cheer.

Axel was tucking his glasses back in his pocket and putting his tools away when a Martin man, a mischievous twinkle in his eye, stepped up. "Hey, Axel, aren't you going to take out that other tenth?"

Axel looked up slowly. That was asking a lot. That was like asking a man who had just walked across Niagara by tightrope to try it again on one foot. Axel didn't speak. He put his glasses on and got out his measuring tools.

Now the word spread through the Martin shop like wildfire. Axel Swenson is going to try to take out a tenth! In hushed silence, men gathered to watch the old Swede who was locking horns with the infinite.

He had his measurements now. "Oop," he told the crane man. Then he reached in



He picked up his tools and headed for the door.

and scraped the selected spot . . . caressingly, gently as a mother her babe. He stepped back. "Hokay," he said. He picked up his tools and headed for the door.

"Hey! Wait a minute!" the Martin man called after him. "You can't leave here yet!" They hadn't even had a chance to check it. Maybe the old Swede had put it back to three tenths out, or even worse.

Axel yielded . . . paused at the door.

A Martin man straightened up, faced the group, his eyes bulging. "On the nose!" he breathed. "On the nose! Not a flicker out!" They looked around for Axel . . . but Axel

was on his way to the airport. It didn't surprise him.

* * *

Craftsmen like Axel Swenson and tools like the P&W Jig Borer are responsible in important measure for the success of American war production. Their precision underlies every large-scale metalworking operation. If you need *basic accuracy for mass production* — now in war work, later in peace — call on Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn.

*All names except our own are fictitious; the story, however, is fact.

PRATT & WHITNEY
MACHINE TOOLS ★ SMALL TOOLS ★ GAGES
WEST HARTFORD CONNECTICUT

Basic Accuracy for Mass Production

to bring down the day's average. Proof positive of this comes in the fact that the union is bringing to management attention a variety of improvements which are sought for the department to reduce down time!

To install the plan required about five extra people in the Murray-Ecorse organization for checking and record keeping.

The broad result of this program up to now has been to increase output some 15 per cent in this plant. Hitherto, the only way such a showing might have been made possible would have been to increase the payroll by 15 per cent. The effect of such a program on the manpower problem is obvious; the moral is at hand for anyone to see.

There are a few other incentive plans now operative in the erstwhile automotive industry. The UAW is supporting them when they are recommended by the locals involved, but refrained last week from committing itself to a firm policy, the vote in the executive board appearing to be along factional lines. Support for incentive programs came from Richard T. Frankenstein, vice-president in charge of aircraft organizational work, which would seem to indicate that the aircraft industry might have favorable opportunity ahead to install them. Opposition came mainly from Vice-President Walter P. Reuther, head of the General Motors section; this could be taken to mean positively that there will be union opposition against incentive plan programs by General Motors—which company, incidentally, has been strongly favoring the incentive plan idea.

IMPORTANT steps are being taken to solve the manpower problem at Willow Run. As a result, the destiny of Willow Run is once more undergoing a transitional period from which it will emerge primarily as an assembly plant for B-24 bombers rather than a manufacturing and assembly operation combined.

Manufacturing operations will be moved out to other Ford plants wherever possible. They are likely to go in major degree to factories in Missouri, Minnesota, Tennessee and perhaps other states as well. At the same time, efforts will be intensified to sub-contract manufacturing and sub-assembly work.

As a result of this program, Willow Run manpower needs will be considerably reduced. Where a few months ago they called for a payroll which would run close to six figures, the indication now is that perhaps as much



TO MEASURE AXIS: With a pair of calipers, George Mathews checks spacing between blades on a steam turbine spindle for a new war cargo ship. These hundreds of blades will extract 2000 horsepower from steam. They are being built on a quantity basis at a new plant of the Westinghouse Electric & Mfg. Co.

as 25 per cent of this earlier total will be lopped off. This will move Willow Run a substantial distance along its way toward a full complement of manpower, a goal that appeared all but impossible to achieve under the complete manufacturing and assembly program in effect earlier.

The Willow Run plant will likely continue to produce major sub-assemblies which will be shipped to other B-24 plants for final assembly operations.

As yet there has been no clear division of the work which will be continued at Willow Run and that which will be shipped away. Final form of the split-up will be determined solely by what and how much can be moved out of the man-shy Willow Run area. Outside hopes of government men concerned with the general Detroit area labor problem are that the total payroll may be cut more than 40 per cent, although this appears a rather distant and hard to achieve goal at this time.

Sub-contracting will also be the rule on aircraft engine production by Ford, which is undertaking to quadruple its output on 2000-hp. Pratt & Whitney airplane engines by utilizing Memphis and Kansas City plants and perhaps one other erstwhile passenger car assembly plant as well. To undertake this decentralizing of the operations will require removal of

5500 machines including large heat treating furnaces, grinders and heavy lathes. Output will be continued constant during this removal process by building surpluses and then moving the machines in sections of batteries, so that some are still functioning at the old location while others are being installed at the new points. This pattern of removal will probably be followed on the Willow Run decentralization.

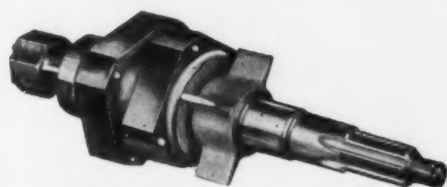
AS space is sought for certain of the Willow Run operations, a share of attention will likely be devoted to the Ford tire factory at River Rouge. This space will shortly be available. Equipment formerly occupying it has been moved out on instructions from the Treasury Department, which made the purchase for Lend-Lease transfer to Russia.

Shipments began last Dec. 16 and will be concluded in the near future. Russia will utilize all military tire building machinery, the balance being turned over to domestic tire plants.

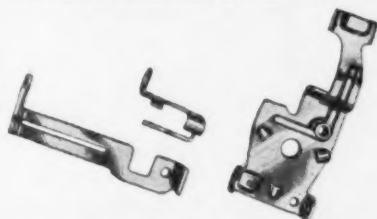
The unprecedented movement of a large plant abroad posed many new problems for the shippers. In cooperation with Russian engineers Ford officials supervised match-marking of all equipment in the plant, even to the extent of keying pipes which were ripped out of concrete flooring and torch cut into sections. These match-markings were duplicated on detailed blueprints, and once the shipment has been entirely received in Russia, it will be necessary only to fit the pieces together by markings and begin operations. As a matter of fact, Ford people believe the Russians will have by far an easier time getting into production than did River Rouge when the plant was first started up, inasmuch as the shipments include everything, right down to the smallest nuts and bolts, along with completely detailed instructions as to how many tools will be necessary for re-erection and for manufacturing.

Shipment of the plant abroad does not necessarily mean that Ford is leaving the tire business permanently. The company still retains its rubber laboratory and had done nothing about tearing out the foundations for the huge Banbury presses and other facilities in the tire building. A return to tire fabrication at River Rouge would not be surprising after the war; neither would complete divorce from that sphere of operations.

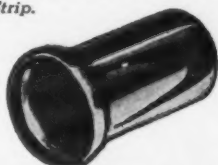
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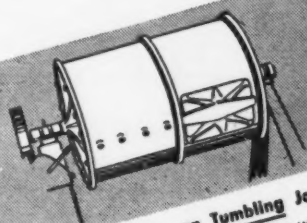
EASY-TO-MACHINE steel that resists corrosion is needed for making magneto shafts ... a difficult production job made easy by Carpenter Free-Machining Stainless.



SEVERE BENDING with or against the grain is no problem when switch parts like these are made from soft and ductile Carpenter Stainless Strip.



NO PROCESS ANNEALING on this difficult deep drawing job, thanks to the ductility of Carpenter Stainless Strip.



Check the Water on Tumbling Jobs!
On tumbling jobs, make sure the water used is "soft". Hard water forms a lime soap, impossible to remove. Balls so coated do not impart a satisfactory finish to the work. Reduce hard water to "soft" water before charging the barrel. This is done by adding 1 oz. of trisodium phosphate per grain of hardness per 100 gals. of water. Your water company can tell you the grains of hardness per gallon of your water.



The Carpenter Steel Company
121 Bern Street • Reading, Penna.

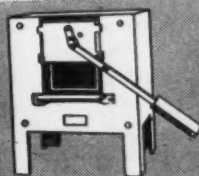
to Faster Production of Stainless Parts

... and Reduce Your Stainless Steel Scrap Loss

Let Carpenter help you check *all along the line* to increase output and reduce your Stainless Steel scrap loss. For example, would a press speed *reduction* of 10 to 15% increase output by cutting rejects due to die galling and similar difficulties?

To help you size up your production operations, we offer a few of the practical suggestions collected by Carpenter men who have spent a good part of their lives solving Stainless problems. Among these suggestions may be an idea you and your men can put to work.

And remember—your nearby Carpenter representative is ready to help you lick your stubborn fabricating problems. He can give you first hand assistance, and keep you in touch with our Metallurgical Department. If you find the going tough, call on him.



Annealing and Heat Treating Stainless?

Anneal all Stainless forgings—whether they are air hardened or not. Do not pack Stainless Steels in a carburizing compound as resulting surfaces will be inferior in corrosion resistance. And when hardening Stainless Steels by heat treatment, it is generally a good rule to soak pieces at least 20 minutes per inch of thickness after bringing them uniformly up to heat. After hardening, the steel should be drawn back to get the hardness, strength and toughness desired.

How About Tool Steels and Lubricants?

Are your tools and dies made of the correct steel for each job? Re-stoning of dies and regrinding of tools is costly in shut-down time. Frequently, an analysis of your tool, die and lubricant set-up will point the way to getting rid of production "bugs". A complete review of procedure may help boost output and conserve much-needed metals.



USE THIS Carpenter Working Data Book to help you get more production, fewer rejects, from every pound of Stainless Steel. Use it to help you plan the development of your post-war products. A note on your company letter-head is all that is needed to start this book on its way, anywhere in the U. S. A.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington

L. W. MOFFETT

• **Joint statement by departments strikes at unfairness of flatly controlled profit and seeks to justify renegotiation statute and its interpretation by departments.**



WASHINGTON — The War, Navy and Treasury Departments and the Maritime Commission issued a joint statement recently dealing with the contract renegotiation statute and its interpretation by the departments. The statement is divided into two parts. The first tells why the services favor contract renegotiation in lieu of a flat profit limitation and why it is more mutually desirable from the standpoint of the services and their contractors. The second part tells how the law has been applied.

War's and Navy's records since the passage of the Act in April, 1942, show that more than \$1,000,000,000 each represents money returned to the government through the activities of the Price Adjustment Boards which were established under the Act.

The principal reasons advanced in favor of renegotiation over flat profit limitation are: (1) The War and Navy Departments are opposed to uniform flat percentage profit legislation because this virtually places contracts on a cost-plus basis; (2) it is felt that the rate of profit should be related to the contribution and performance of the contractor and not to a fixed percentage; (3) the flat profit is unfair because it penalizes the efficient contractor and rewards the more careless man whose costs may be higher; (4) the flat profit is unfair to the contractor who finances his own operations as compared to the one who operates a government financed plant.

WITH admirable concern for the conscientious contractor, the statement strikes again and again at the unfairness of flatly controlled profit. The law which limited such contractors to a 6 per cent profit was repealed in April when the renegotiation statute took effect. Consequently, the statement's tenor is strangely one of justification, since it goes to great lengths to prove that the repeal of the percentage profit law was a wise and just move on the part of the services to protect contractors.

"Many vital war items have required for their production the application over a period of years of highly developed inventive genius, original designing and mechanical skill," it is pointed out. "Also many products require such precision in manufacture that few contractors can qualify for their production. Furthermore, it is not infrequently that the contractor who develops such an article is producing it in his own plant with his own capital, and with his own painstakingly developed machinery. Another contractor may be engaged as a new and separate source of supply, and may receive new plant machinery and equipment without cost from the government; the know how and patent licenses may have been obtained without cost from the original contractor. As a result of these contributions and modern equipment, the second contractor frequently pro-

duces the article at a lower cost than the original contractor. It is obvious that the second contractor is not entitled to the same rate of profit as the original one.

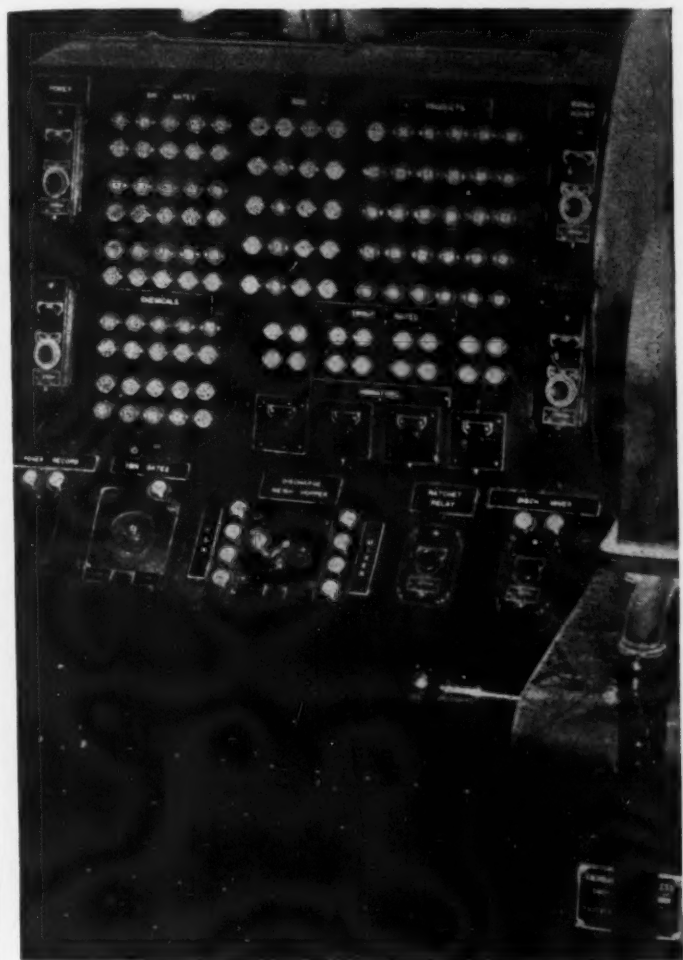
"On the other hand, in some cases the costs of a new producer have been twice that of the original contractor because of a lack of skill and know how. Under fixed statutory limitation the new contractor might receive twice the profit of the original producer. This is obviously most unfair. Consideration must also be given to the situation what a run of the mill product, requiring little skill, is being manufactured and where material costs are relatively large; and also to cases where subassembling is performed by a contractor.

"It is apparent, from these examples, that a uniform maximum rate of profit for everyone would necessarily be unfair to many. Furthermore, industry studies have revealed diversities in production so varied that, with rare exceptions, even application of a uniform rate to broad classifications by industries would not be practical or equitable. Renegotiation appears to be the only method so far suggested which is sufficiently flexible to cope with the diversity between, or the variations within them."

THE renegotiation law is flexible as the statement says. One provision says that all contracts or sub-

PACIFIC CONVOY: Although hounded by Nazi submarines this convoy of American merchant ships cruises peacefully in the Pacific bringing needed supplies to MacArthur in Australia. Jap bombers in this area are an added hazard.





EXACT CONTROL



FOR SURE PERFORMANCE

THE bomber pilot's course is guided by precision instruments. Refractory manufacture, too, must be guided by precision control.

Years of experience in meeting practical problems in the open hearth and electric furnace have shown that refractories best suited for modern steel making cannot be made by rule of thumb methods. They must be designed to meet specific conditions met in the furnace, and they must be manufactured to design...for balanced chemical composition, positive physical characteristics, and uniformity of product.

To insure the desired properties in the manufacture of products where extreme accuracy is essential, Basic Refractories developed and installed a plant built around precision equipment, operating automatically through-

out. Key to this equipment is the electric control board shown here.

It provides exact and automatic control of those final, critical stages of a process—proportioning and mixing—which began with the manufacture of synthetic mineral compositions designed to perform specific work. Because these controls are mechanical and automatic, there is no possibility of deviation or error.

Ramix...Hearth Patch...695 Plastic...Gunmix...are typical products of this plant. Their outstanding performance in severe service is familiar to most furnace men. No small part of their continued success is due to the fact that, combining the best of research and practical experience they are made by a process rigidly controlled to insure uniformity and dependable quality.



BASIC REFRACTORIES, INCORPORATED
CLEVELAND, OHIO

PRODUCERS OF MAGNESITE AND DOLOMITE HEARTH MATERIALS FOR STEEL FURNACES

contracts of more than \$100,000 shall carry a renegotiation clause providing that contract prices shall be reviewed at periods when either the Secretary of the Navy, the Secretary of War, the Secretary of the Treasury or the Chairman of the Maritime Commission thinks that the profits can be determined with reasonable certainty. The contract may have been made prior to April 28, 1942, but to be subject to the Act, the last payment of the contract price must be made before this date.

Whenever the Secretary of the Navy, the Secretary of War, the Secretary of the Treasury or the Chairman of the Maritime Commission believes that excessive profits have been realized from any contract with his department or commission, he may require the contractor to renegotiate the contract. No renegotiation of the contract price shall be commenced more than one year after the close of the fiscal year, in which the completion or termination of the contract occurs.

Contracts for the products of raw materials producers are outside the regulation. Illustrative of this category are: Aluminum, ingots, bars, powder, pig iron, coal and vanadium. Certain other contracts are subject to renegotiation at the discretion of

one of the heads of the three departments. Contracts may be made subject to renegotiation only in part, or for a period. Contracts outside the territorial limits of the United States or Alaska, may be exempted.

Any contract where it can be determined in advance with reasonable certainty, such as following classes of agreements: for personal services; for the purchase of real property, perishable goods or commodities the minimum for the sale of which has been fixed by a public regulatory body; leases and license agreements; agreements where the period of performance will not be in excess of 30 days, the contract can be exempted.

THE following classes of Treasury contracts have been held to be subject to the law: (1) Contracts placed under section 201 of title II of the First War Powers Act of 1941 (principally lend-lease contracts, which may be identified by the symbols "DA-TPS" preceding the contract number); (2) Contracts for strategic and critical materials placed under the authority of the Act of June 7, 1939 (contracts made after March 1 may be identified by the symbols "SCM-TPS" preceding the contract number); and (3) Contracts for supplies for refugee relief under



NEW GEARMOTOR LINE: Inspecting one of the first of a new line of gearmotors to come from Westinghouse production lines are Folke Richardz (left) manager of gear engineering, and L. R. Botsai, manager, gearing department, Nuttall works.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



the Red Cross Program, placed under the authority contained under title III of the Third Supplemental National Defense Appropriation Act, 1942 (contracts may be identified by the symbols "RR-TPS" preceding the contract number).

Other types of contracts regularly entered into by the Treasury Procurement Division in the ordinary course of business prior to the war period, as such are not subject to renegotiation unless negotiated under authority contained in title II of the First War Powers Act, 1941. However, purchase orders issued by the War and Navy Departments and the Maritime Commission under the General Schedule of Supplies Contracts which are entered into by the Procurement Division on behalf of all departments are considered as being subject to the renegotiation law.

All so-called lend-lease contracts entered into by the War Department, the Navy Department, the Treasury Department and the Maritime Commission are subject to the provisions of section 403. However, lend-lease contracts entered into by any other department or agency are not subject to renegotiation.

A lack of
experience
need not reduce
inspection
precision

It does require both skill and experience to handle close tolerance work on the time-honored fixed size gages—and skilled inspectors are scarce. But that need not interfere with precision in your plant.

Substitute for the gages that require skill, the gaging instruments which give you greater precision and at the same time eliminate the human factor. Sheffield precision gaging instruments in the hands of inexperienced inspectors are guarding product quality in hundreds of plants today.

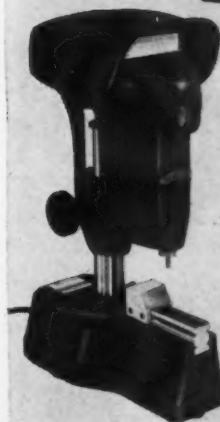
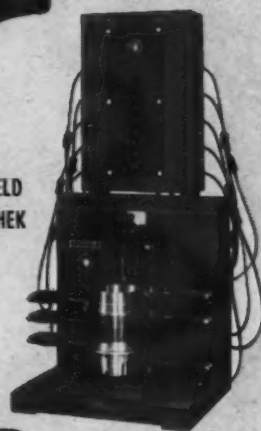
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THE **SHEFFIELD** CORPORATION
DAYTON, OHIO, U. S. A.



SHEFFIELD
ELECTRICHEK

SHEFFIELD
MULTICHEK



SHEFFIELD
VISUAL GAGE

SHEFFIELD
PRECISIONAIRE



• **Stabilization plans fail to halt Coast industrial migrations . . . Reported price ceiling removal on tin cans cheers copper industry . . . Aircraft makers plan for post war.**



SAN FRANCISCO — Paul McNutt's latest national labor stabilization plan, issued April 18, was announced on the coast with a roar that shook every employer and worker. But now that some intrepid persons have gathered courage to examine the order closely, it appears that the War Manpower Commission has given birth to another lamb in lion's clothing.

The national plan theoretically provides that a worker may not leave an essential job for a non-essential one nor switch jobs within essential industry solely in order to secure more pay. To enforce this proviso, the WMC for the first time accompanies its finger wagging with a threat to slap a \$1,000 fine or a year in jail on violators as well as other horrific penalties.

Special provisions are made for areas or industries in which stabilization programs approved by WMC already are in effect. Since this happens to be one of the very few such areas, and because workers in the Pacific Coast hinterland have had experience with stabilized industry under logging and non-ferrous metal mining stabilization, eyes are turned westward. Our war experienced "stabilized" workers should prove capable panders for the neon lighted loopholes in the new broader regulation.

For instance, it is provided that a statement of availability (meaning a worker can change to another higher

paying essential job) shall be issued by the worker's last employer or the WMC whenever the individual has been fired. Logging camps, never noted for their high rates of pay, last fall were blanketed under a stabilization program having a similar provision. Some of the loggers heard that they were frozen on the evening news broadcast, and left camp before breakfast the next morning. The new program should halt that sort of thing because of its threatened penalty. Other loggers, willing to play ball with the WMC on formalities, greeted their employers this way:

"The radio said we were frozen here unless we get fired. You're paying us 85c. an hour and the shipyards offer 95c. to start and then on up. That's where we're going. Do you want to fire us now, or shall we loaf on the job for a week or so, collect wages, and get the rest of the boys to come with us?"

MOST of the men presenting this type of argument were readily "fired." That wasn't the end of the story, though. Many employers faced

with a continual drain on their dwindling labor supply, made application to the War Labor Board for permission to pay competitive wages with those industries which were taking their labor. That is, they made such application if their price ceilings permitted them to pay higher wages without going into the red. Many such applications were granted prior to April 8.

But on the fateful morning President Roosevelt's "hold the line" wage freeze, known to the lawyers as Executive Order 9328, took from the War Labor Board authority to make upward wage adjustments on the basis of inequality within the industry or within the locality, or in order to make more effective prosecution of the war. This meant that the Board could authorize wage increases only up to the extent provided in the Little Steel formula, or in order to correct "sub-standards of living."

Even the low paying industries had hit the Little Steel ceiling long ago, and "sub-standard of living," although not yet thoroughly pinned down to exact definition by the Board,

SHASTA DAM: Construction continues unabated on Shasta Dam, now about 80 per cent complete. High blocks in the left abutment section seen at the upper right are within less than 20 ft. of their ultimate height. The 15-ft. penstocks in the foreground will carry water from the reservoir to drive the 103,000-hp. hydraulic turbines in the power plants.

U. S. Bureau of Reclamation



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TOCCO TRIPLES OUTPUT OF 10 "CLETRAC" PARTS

THE Cleveland Tractor Company, manufacturer of well-known "Cletrac" military, industrial and farm tractors, cites these benefits of hardening parts with a 100 KW "TOCCO Jr.":

Greater Output. Average production speed now three times that of former hardening methods. Elimination of carburizing has cut hardening cycles on most parts from 8 hours to a few seconds.

Versatile. 10 widely different "Cletrac" parts—from 28" sprockets to 3/4" link pins are hardened on one "TOCCO Jr." New applications being developed continually with the aid of TOCCO engineers.

Lower Costs. Cuts man-hours. Eliminates expensive plating, carburizing and straightening operations. Replaces scarce alloys with carbon steels. Simple to operate, doesn't require skilled operators.

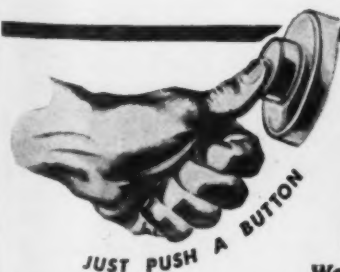
"TOCCO Jr." equipment is built for continuous production service. Dependable, rugged motor-generator supplies power at a safe, low voltage.

Find out how TOCCO can improve your war production and enable you to cut costs and improve your products for postwar markets.

"CLETRAC" PARTS HARDENED BY TOCCO SAE 1045 Steel Surface-Hardened to 60-62 R.C.

Part	Production Per Hour
Sprocket	15
Track Pin (Small)	550
Track Pin (Large)	400
Bracket Plunger	100
Shift Shaft	150
Ring Gear	60
Lock Pawl	120
Pivot Shaft	100
Link Pin	100
Rocker Arm Shaft	100

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio



JUST PUSH A BUTTON

TOCCO

World's Fastest, Most Accurate Heat-Treating Process

**HARDENING
ANNEALING
BRAZING
HEATING for
forming and forging**

has come to mean wages of less than 40c. per hour. This colloidal connotation still exists, principally because most adjustments authorized in the past were on the basis of inequality, something much easier to prove. But it's a cinch that there will be few areas where 85c. or 90c. an hour can be stretched to being sub-standard, even though \$1.25 an hour is being paid across the street, and thus no basis for authorizing a wage increase will exist.

SOME leeway is given to Economic Stabilization Director Byrnes to authorize "reasonable adjustments of wages and salaries in cases of promotions, reclassifications, merit increases, incentive wages or the like, provided

WMC director, acknowledged difficulties created by the present situation in testimony on railroad labor shortages before a Senate Military Affairs Sub-Committee hearing in San Francisco last week.

"How are you going to freeze a man at 46c. an hour when he can go across the street and get 95c.?" Hopkins asked in testifying that low wages were forcing railroad workers into other jobs at the sacrifice of their seniority rights.

"It is going to be difficult to work this out. I don't know how we are going to recruit labor for low priced jobs," he added.

Such an admission from an official so close to the situation may provide the necessary knife to cut away preju-

dicement, also previously had been introduced in southern California, Nevada, Arizona, the Portland industrial area, and the state of Washington, outside the Portland area.

CONFIRMATION has not yet been received here, but reports indicate that OPA will issue immediately an order removing from price ceilings tin cans destined for detinning or shredding plants, for ultimate use in copper precipitation. Although a War Production Board order long has effectively restricted tin cans collected in the West to eventual use by the copper industry, OPA has persisted in classifying them as steel scrap, and placing them under the steel scrap ceiling. Because their bulkiness leads to high freight costs, collected cans have not moved freely from points of origin to the shredding, detinning and processing plants under the steel scrap ceiling.

With the ceiling lifted, or removed altogether, it is anticipated that an approximate price of \$18 per net ton f.o.b. shredding, processing and detinning plant will be offered, either for tin clippings or discarded tin cans. This would permit shipping the cans from remote points to the processing plants at Dallas, Kansas City, Los Angeles, San Diego and South San Francisco. Faced with the necessity of securing well over 100,000 tons of cans for use in precipitation this year, a big hunk of the total discard in the West, copper plants are only too anxious to pay whatever charge is necessary to secure the cans.

That the aircraft industry is not neglecting altogether the question of post-war production was indicated last week in glimmerings from top officials of Douglas and Lockheed. Donald W. Douglas, president of Douglas Aircraft Co., Inc., told his annual stockholders meeting that the company has recently appointed a committee for post-war study and that the firm would come out of the war with many salable civilian planes. Tom M. Girdler, chairman of the Consolidated Vultee Aircraft Corp. board, told a San Diego civic organization that Consolidated would draw in its horns except from proximate neighboring communities where it recently has established sub-assembly plants, contract at plants in other sections of the country, and keep San Diego as its principal manufacturing center. Girdler acknowledged that military bombers now produced by the company would not be adaptable for commercial transport after the war.



IN A HUDDLE: With new officers of the National Aircraft War Production Council, Inc., are shown Donald W. Douglas, first president of the AWPC West Coast, and Rear Adm. R. A. Davison, Assistant Chief of the Naval Bureau of Aeronautics. Left to right they are: Rear Adm. Davison, Glenn L. Martin, LaMotte T. Cohu and Mr. Douglas.

that such adjustments do not increase the level of production costs appreciably or furnish the basis either to increase prices or to resist otherwise justifiable reductions in prices." That may be a loophole, but it will take an awful lot of grease for most men to wriggle through. Stabilization or not, industries caught now with low wage standards inevitably seem to face the prospect of having their labor force evaporate through the tiny pores of the regulations while they, themselves, are forbidden to pay wages sufficient to support recruiting programs.

This whole discussion, of course, refers only to the relationships between essential industries. In so far as the Pacific Coast is concerned, non-essential industry has practically ceased to exist.

Even William K. Hopkins, regional

dice against enactment of national service legislation which, after all is said and done, is the only effective answer yet suggested, other than paying everyone an equal wage for every type of work.

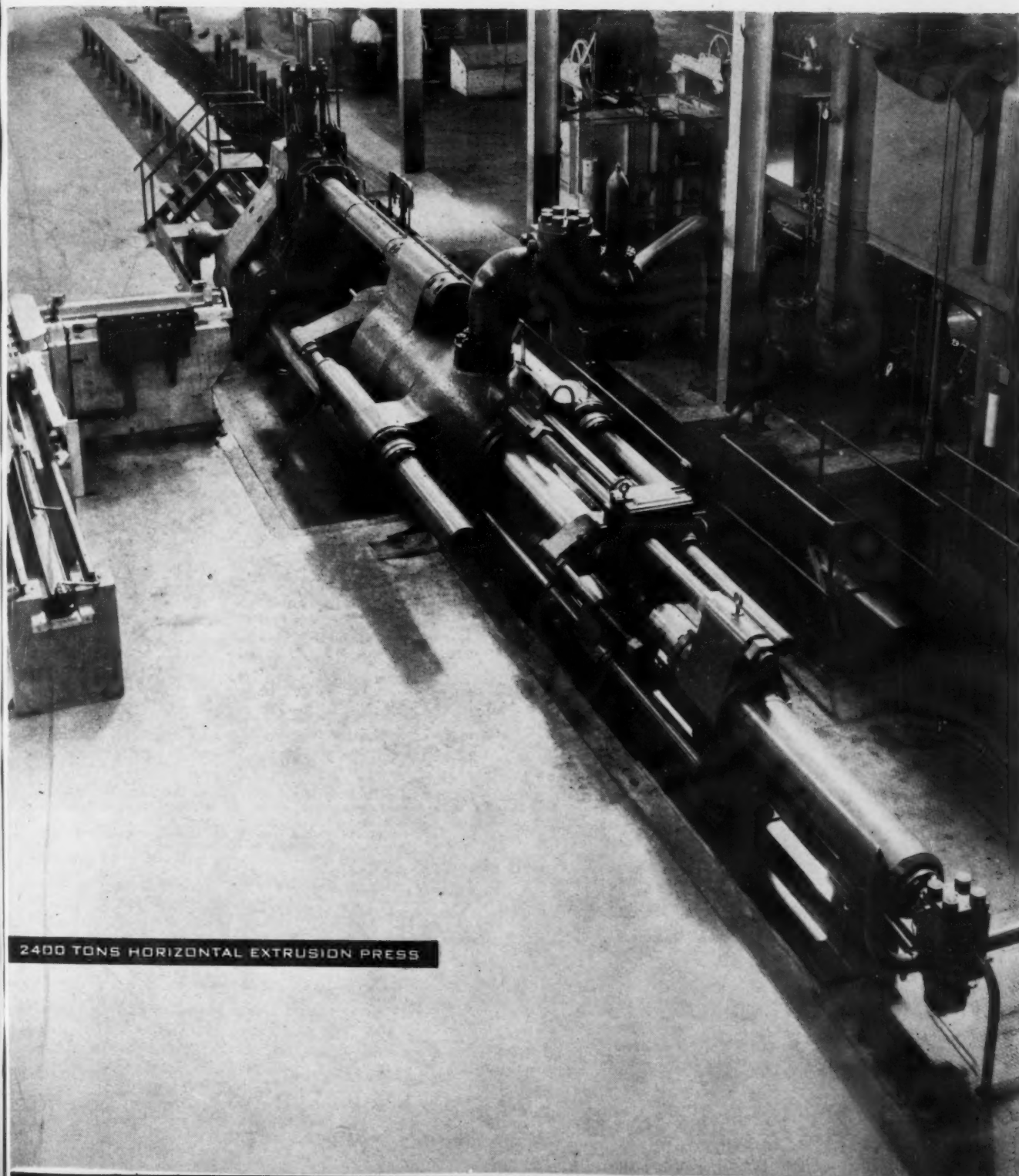
Rough as the jolt of the Labor Stabilization Plan has been here, tying up job placements while waiting for rulings on details, it would have been much rougher had not leading management and labor representatives in the area held conferences over a period of several months which eventually led to the formulation of the northern California area plan. As it turns out, the plan meshes perfectly with the national plan and places both employers and workers in this section in a more advantageous position than elsewhere. Other voluntary stabilization agreements, in various stages of effec-

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2400 TONS HORIZONTAL EXTRUSION PRESS

HYDROPRESS · INC.

ENGINEERS

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**HYDRAULIC PRESSES · ROLLING MILLS
PUMPS · ACCUMULATORS**

570 LEXINGTON AVENUE · NEW YORK · N. Y.

Fatigue Cracks

BY A. H. DIX

Lighting Up a Marijuana

••• Postwar plans are now as thick as dropped r's on the Harvard Club floor. Practically all God's industrial chillun got some, and being strictly conformist, we have put on our infra-red glasses, the better to pierce the murky future, and are roughing out a set of plans for ourselves.

Now more than ever we envy the German general who calmly reached into a pigeon hole of his desk when he was told that war had been declared, pulled out a dust-covered roll of papers, and said, "Here are complete campaign plans." What war it was and whether the general's plans were ever used, we don't know. But if they were used, we hope they flopped, as we do not want anything to interfere with our conviction that the unforeseen has a habit of making a sucker out of plans made too far in advance.

It would comfort us if we knew that other postwar planners felt as we do—like a nearsighted man in a dark room, wearing boxing gloves, and attempting to measure the thickness of a jellyfish with a pair of rubber calipers.

We wish we had the courage to ink in boldly the whole of our postwar route. But as some parts are obscured in mist, we will use Mr. Higgins' India black on only the beginning. The later stages of our journey we will indicate in the lightest pencil, so that if later on we discover the lay of the land and prevailing weather conditions favor a change, we shall be able to make it without having to go back and start all over again.

Patriotic Pun

••• Henry Leonard of the business department saw a motor truck the other day with this painted on the tailboard:

IF YOU WANT TO GO BY,
BUY BONDS

Stoppers

The Jeep Learned to Steer by Watching the Printing Press—*Torrington Co.*

The Goblin that works for America—*Union Carbide & Carbon Corp.*

We could lose this War between 5 p. m. and 7 a. m.—*General Electric Co., Nela Park.*

You Ask for a Glass, and You Get a Glass

••• Some authorities are rarely asked for information because of their inability to give quick answers. You ask for a glass of water and they throw Lake Superior at you. So rather than drown information you go thirsty.

The same thing applies to looking up answers to questions on government regulations. The information is in the fat books all right, but digging it out is frequently an hour's work. So you call up Joe, who knows all the answers and who gives them in telegraphic form. But Joe is out, so you waste a lot of valuable time.

To remedy this situation as far as CMP and priorities are concerned, our Washington bureau has been burning the midnight mazdas for weeks. Its labors are over and their fruits are given you in this issue, in the shape of a 28 page CMP-Priorities Guide.

It isn't offered in competition with the thick tomes that give chapter and verse on every regulation and ruling. But for quick answers on the questions that commonly come up, you will find it exactly what you had been hoping we would be thoughtful enough to get up. Extra copies are 25c. in stamps or coin.

Number Mixer

It shows how Lord got and spent his income down to the last pence.

—*Advertising Age*

"Down to the last penny" is what you mean, *Advertising Age*. Pence is plural, like *lice*. Tuppence, thrip-pence, but never wuppence.

U. S. Too Serious, Says Jap Fun-Lover

••• In contrast to the often-expressed opinion that this country still does not realize it is at war, we quote Major Gen. Kenryo Sato, director of the Military Affairs Board of the Japanese War Ministry, who said in a recent broadcast:

Our strategies and tactics are carried out on the basis of sport, while the United States has completely forgotten the spirit of sportsmanship. . . . I would like to say to the American people, "Do not become quite so serious."

Of course, the general's advice will be taken, for as the war continues we shall emulate more and more the Japanese in their proverbial lightheartedness, sportsmanship and love for good, clean fun. But before peace comes we expect to hear the general complaining of over-compliance.

They Didn't Know It Was Funny

••• Even though the irony in the foregoing paragraph is heavy-handed, we would like to label it. Oral irony identifies itself by tone of voice, lip curling, nose wrinkling, eyes flashing and making with the hands. But written irony is dangerous, and is often misunderstood.

Take, for instance, the case of Deac's friend who runs a machine shop. He was so disgusted with green lathe hands that he got up an ironical instruction sheet, reading:

Headstock bearings are better without too much oil. Bearings never run so true as in the minute or two before they freeze up.

You can save a lot of time if you always engage the back gears while the spindle is still revolving.

If you have difficulty in putting a chuck on, a 4-ft. bar will save cleaning the threads.

Never touch the ways with a rag. There might be emery in it. A good man can often spin off a chuck and catch it as it drops.

As is so often the case, the irony backfired, and the instructions were taken literally.

6000-Mile Crack

••• We wonder how Roxy Siota, of the Institute of Physical and Chemical Research, Tokyo, is these days. We have had a soft spot in our heart for Roxy since he wrote us on June 15, 1941:

Your column is a spice of life. Across the vast Pacific it has been cracking my fatigues many a time.

Alliterative Apex

••• As a unique bit of product-naming we cite the dump truck made by Dempster Bros., Inc., Knoxville, Tenn. It is called, as you already know if you read the advertising pages of your favorite family journal as carefully as you should, the Dempster Dumpster.

Puzzles

Last week's generous thief who ended up with only one apple started out with 36.

The Apr. 8 card problem was nothing at all to E. N. Yeager, Frank Stebbins, and B. H. Hawkins. Paul Leon (American Institute of Steel Construction) Price wants to know how it is that the Apr. 1 Bren gun, which fires 300 rounds per min., shoots only 24 in any 5 sec. period. Wouldn't that make only 288 per min., he asks? No, we reply. Only 24 come out in any 5 sec. period, but the next is just on the verge, and all these verges add up to 12, making 300 for the minute.

To stay in the front row you must give the right answer to this in 10 seconds:

A certain plant reproduces by doubling each day the area it covers. If, starting with one plant, a certain area is covered in 30 days, how long would it take two plants to cover the same area?

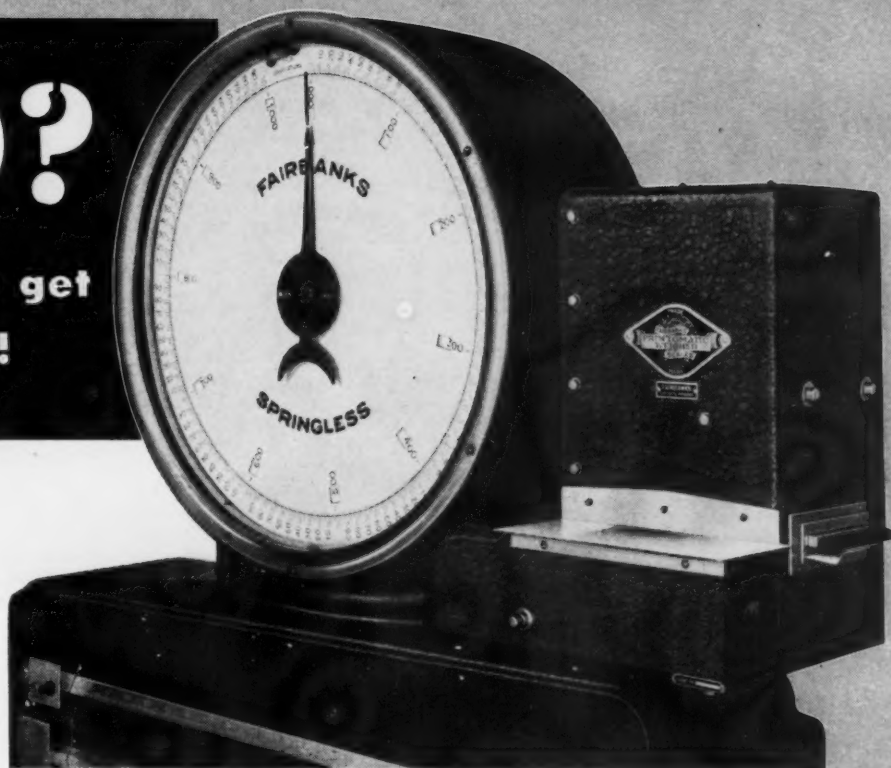
GOOD?

They have to be to get where they are!

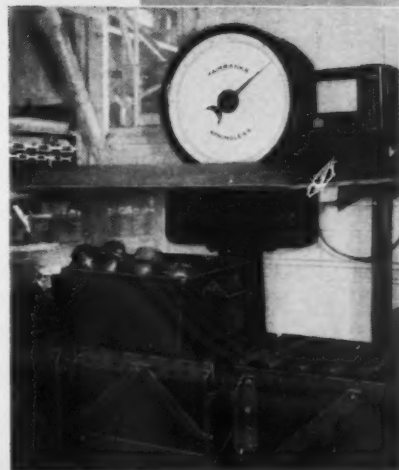
In good light or bad . . . operated by experienced weighmen or novices . . . weighing all kinds of commodities . . . Fairbanks Printomatic Scales have proved to the world that they have what it takes! They eliminate human errors, speed up weighing operations, and provide a **PRINTED** record showing what was weighed, who weighed it, and when.

Fairbanks Scales have proved their reliability through their 113 years of service. Each part, carefully designed for its specific function and built with precision, guarantees your incoming, outgoing, and processing weight operations.

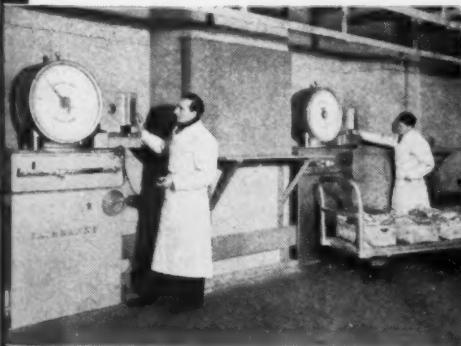
The Printomatic records the correct weight automatically, prints it



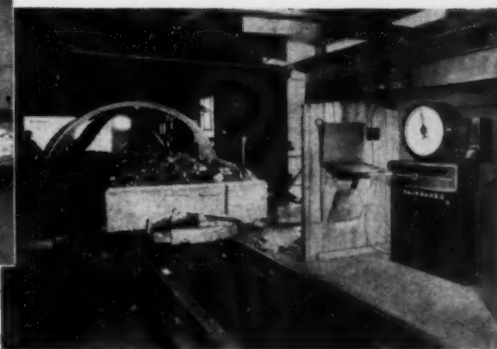
on a roll tape, weigh ticket, or combination of both, or on gummed tickets. Adaptation of Fairbanks Printomatic Scales to weighing problems, simple or complicated, is practically unlimited. Why not investigate what these scales can do for you? Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.



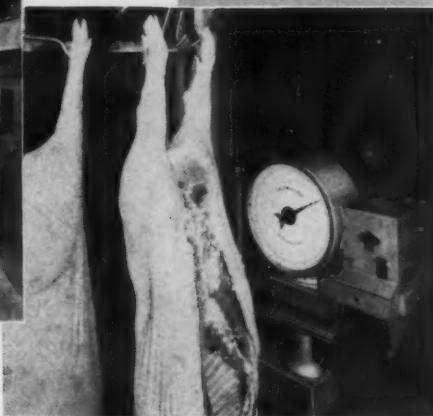
Fairbanks Printomatic Conveyor Scale ➔ keeps printed record of piecework in foundry.



↑ **Fairbanks Printomatics** recording meat shipments to retailers. Each of 221 different kinds of meat is given a designating number.



↑ **Fairbanks Coal Mine Car Scale** with Printomatic weighs mine cars in motion, protecting employer and miner.



➔ **Fairbanks Portable Dial** Scale with Printomatic weighing and printing records of meat to retailers.

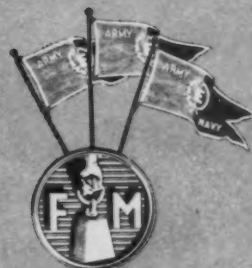
FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
SCALES

WATER SYSTEMS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
RAILROAD EQUIPMENT



Scales



Dear Editor:

PRIORITIES

Being a constant subscriber to your magazine, I have on hand the sixth edition of **THE IRON AGE** Priorities Guide, dated June 4, 1942. Did you publish a later edition? If so, will you send me a copy?

DAVID H. LENTZ,
Supt. of Industries

Illinois State Penitentiary,
Joliet, Ill.

● The seventh edition of the Priorities Guide was published Oct. 8, 1942. The eighth edition is a separate section in this issue. Price of extra copies is 25c each, in stamps or coin.—Ed.

FOREMAN CARTOON

Sir:

We are interested in poster size reproduction of the Fitzgerald cartoon on page 83 of your issue of April 15 entitled "Action on the Home Front." Can you furnish blowups about 24 by 30?

U. S. YOUNG,
Personnel Director

Toledo Steel Products Co.,
Toledo, Ohio

● We have made no enlargements, but you have our permission to make them, provided the usual credit line is used.—Ed.

"SCHENECTADY" FAILURE

Sir:

James F. Lincoln speculates on page 90A of the March 18 issue as to what caused the breakage of the welded ship "Schenectady."

Speculations as to what caused the trouble seem to me immaterial compared to the publication of the good news that the trouble could be prevented by preheating.

I repeat, all such cracking, caused by automatic or hand welding, as well as most of the warping can be stopped by preheating. You can preheat with oil, gas, electric resistance, electric induction or by any means, and the heat that is put in by preheating is saved in the welding and it furthermore increases the production rate, because arc welding speed is not limited by fear of cracking.

I don't suppose you will publish this, but we are hoping you will. We will even attempt to bribe you by saying that if you publish this fact, we will take a full page ad about what preheating will do.

C. J. HOLSLAG

Electric Arc, Inc.,
Newark, N. J.

● No bribe needed.—Ed.

SWAN ISLAND UNMOVED

Sir:

The writer has heard much of the wizardry of one Henry J. Kaiser in his shipbuilding production activities but did not know that this gentleman's legerdemain included moving Swan Island from within the corporate

limits of Oregon's Metropolis to the neighboring state of Washington and in making such a transfer, moving the island from the Willamette to another river. To satisfy myself and make sure Swan Island was still in our city limits, I drove along Willamette Boulevard yesterday, parked my car and took a good look, and behold saw it still occupying the spot where it had always been since I came here to live in 1910.

F. S. BEACH

5707 N.E. 28th Ave.,
Portland, Oregon

● Western miracles in mountain-moving and lake-making awe and bewilder us Easterners, but Swan Island is still in Oregon and is hereby restored to that state.—Ed.

DEPRESSED AREAS

Sir:

In your March 25 issue, page 93, you had an article about Scranton, Neglected City, and as stated "there exists in the United States 82 paradoxical industrial areas of unemployment and empty houses." What are these areas?

GRAHAM DAVIS

General Cigar Co., Inc.,
119 West 40th St.,
New York

● The depressed industrial areas listed by the War Manpower Commission Feb. 1 were: Alabama: Birmingham, Montgomery; Arkansas: Ft. Smith, Little Rock; Connecticut: Middletown, Torrington; Georgia: Augusta, Columbus, Rome; Illinois: Bloomington, Danville, Galesburg, Herrin, Peoria, Quincy; Indiana: Muncie; Iowa: Sioux City; Kentucky: Lexington, Owensboro, Paducah; Louisiana: Alexandria, Baton Rouge, Monroe, Shreveport; Maine: Bangor, Lewiston; Massachusetts: Boston, Fall River, Fitchburg, Haverhill, Lowell, Salem, Taunton; Michigan: Kalamazoo; Mississippi: Jackson, Vicksburg; Missouri: Cape Girardeau, Joplin, St. Joseph, Springfield; Montana: Billings; Nebraska: Lincoln; New Hampshire: Concord, Manchester, Nashua; New Mexico: Albuquerque; New York: Central Long Island, New York, Yonkers; North Carolina: Asheville, Durham, Greensboro-Winston-Salem, Rocky Mount; Ohio: Cashocton, Portsmouth, Steubenville, Zanesville; Pennsylvania: Altoona, Scranton; South Carolina: Columbia, Greenville; Tennessee: Chattanooga, Knoxville, Nashville; Texas: Abilene, El Paso, Laredo, Lubbock, San Angelo, Wichita Falls; Vermont: Burlington; Virginia: Richmond, Roanoke, Danville, Lynchburg; West Virginia: Charleston, Huntington, Parkersburg, Wheeling; Wisconsin: Oshkosh, La Crosse, Sheboygan.—Ed.

SHELL RUST INHIBITOR

Sir:

In your April 8 issue, page 66, there is an article regarding a rust inhibitor for shell cases, which you state is manufactured by the Diamond Alkali Co. What is the address of this concern?

H. W. RATHKE,
Sec'y-Treas.

Breareley Co.,
Rockford, Ill.

● Oliver Bldg., Pittsburgh.—Ed.

METAL GAGE COMPARATOR

Sir:

We have admired so much the Metal Gage Comparator in your April 15 issue that we are writing to request, if possible, six or eight copies for our Engineering Department.

W. R. SPILLER,
Chief Engineer

Harris-Seybold-Potter Co.,
819 Washington St.,
Dayton, Ohio

Sir:

We are very interested in the Metal Gage Comparator, and we would like to obtain six copies. What is the price?

JOHN M. BAIN

Sutton-Horsley Co., Ltd.,
30 Commercial St.,
Leaside, Ont.

Sir:

Your comparator for quickly comparing commercial gage standards is quite interesting and could be made very good use of in several departments of our company. Could we purchase six additional copies?

D. N. MUSSON,
Purchasing Agent

Twin Coach Co.,
Kent, Ohio

POWER OF THE PRESS

Sir:

Your article on "Scranton, Neglected City," was picked up by several hundred newspapers — Chicago, New York, Baltimore, Seattle, Boston, Philadelphia, Kansas City — nation-wide. The day after publication, both our Scranton and Washington Chamber of Commerce offices had no less than ten telephone calls each. "Tell us about it," they would say, "we read THE IRON AGE story."

Net results so far during the past month: a bag factory, a clothing manufacturing plant, two plants to make metal products, and the Murray Corp. of America is to build a 500,000 sq. ft. plant, to employ 7000 persons.

Scranton owes much to IRON AGE. March 25, 1943, should go down in the history of Scranton as IRON AGE Day, for that day marks the turning point in Scranton's history.

E. M. ELLIOTT

Representing the City of Scranton and Lackawanna County in Their War Efforts,
1010-16th Street, N.W.,
Washington, D. C.

NE STEEL CHART

Sir:

Under "Fatigue Cracks" in the April 15 issue, you mention a chart which will enable us to match up any SAE or AISI steel and its opposite NE number, which will be a part of an early issue of our "family journal." If and when these charts are available, how much will extra copies cost?

G. E. SHUBROOKS,
Chief Chemist and Metallurgist

Hamilton Watch Co.,
Lancaster, Pa.

● The chart will be in next week's issue. The price of extra copies will be 25¢.—Ed.

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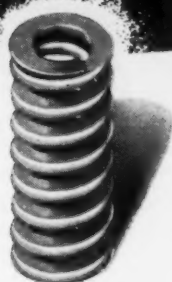
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25¢.—Ed.

1,000,000 TINY HAMMERS ADD TO LIFE OF SPRINGS!



A MILLION tiny pellets—hurtling with incredible speed and striking from every angle—beat a toughening tattoo upon the Muehlhausen Springs inside this huge shot blaster. This hammering "work hardens" the surface to boost the endurance limit of the spring.

Shot blasting also lengthens spring life by smoothing out microscopic "hills and valleys", and thus prevents early failure from stress concentrations at these points.

The superficial results of this process can be seen with the naked eye—for a clean, lustrous finish is produced. But the more important results show up, only after years of service, in the lasting efficiency of Muehlhausen Springs.

MUEHLHAUSEN SPRING CORPORATION
Division of Standard Steel Spring Company
817 Michigan Avenue, Logansport, Indiana



MUEHLHAUSEN



SPRINGS

EVERY TYPE AND SIZE



TWO NEW FOLDERS—FREE

Die Spring Bulletin illustrates, describes 206 sizes and types of die springs.

Armament Bulletin shows importance of springs for many types of war material.



This Industrial Week . . .

- Labor Situation Approaching Climax
- Raw Materials May Return to Spotlight
- Navy's Cut in Tensile Strength Helpful
- National Ingot Output Rises One Point

IN some areas important in the steel production picture, the labor situation was growing more tense this week. A series of disputes already had caused the loss of substantial tonnages of steel, and other stoppages were threatened.

Fourteen short strikes in five days, all seeming to lack a significant cause and apparently unauthorized by union leaders, were suffered by one Chicago district steel producer recently. There was a minor strike in a Cleveland mill and a short walkout at a New York state blast furnace. Close to 15,000 employees of steel company coal mines in western Pennsylvania were on strike early this week and production has ceased at five steel company coal mines in Alabama. If these strikes are a straw in the wind indicating a possible national walkout, steel output will be affected severely, to the detriment of the war production program.

Sources close to organized labor say that the unions will meet the President's "hold-the-line-order" with demands for "stand by" or minimum weekly guaranteed pay. The alternative will be the adoption of incentive wages, but only in cases where the standby wage is granted. Labor's point seems to be that if workmen cannot change their jobs for higher pay that they should at least be guaranteed wages equal to 40 hr. a week. This would force the armed services to put new contracts into plants where they have been terminated or cancelled due to overall cutbacks or to shift the workers to areas where they can be used.

IN addition to the threatened curtailment of coke supplies through a coal strike, the situation in raw materials needed by the steel industry holds promise of regaining prominence in the future in other respects. Even scrap, long absent from the headlines, may return to the spotlight temporarily. Because numerous blast furnaces have been going down for repairs at a rapid rate and because the iron ore movement is far behind expectations, a drain on scrap supplies is held possible. WPB Salvage Director Paul C. Cabot, informed by the WPB Steel Division that total needs for this year will be nearly as high as in 1942 to take care of the steelmaking program, has started a drive for the maintenance of collections and additions to stockpiles of scrap.

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A sidelight in the war materials situation is a decline in the quality of coke because of the type of coal available to beehive oven operators. Coke consumption per ton of pig iron produced in recent months is higher than it was a year ago.

The widely-heralded controversy over the inspection of steel plates has resulted in a significant development—the establishment of a flat minimum tensile strength of 58,000 lb. per sq. in. by the Navy for plates rolled on high speed strip mills. This eliminates the average strength of 60,000 lb. with a minimum of 57,000 lb. on tests. The change will expedite shipments of plates to the Navy since it will not be necessary to hold plates until various tensile strengths have been averaged.

ALTHOUGH some plate producers are not expected to make their full quotas this month, in most cases shipments for April probably won't be much if any below the 5 per cent differential allowed by the WPB. Thus, it appears last week's fears on this subject have been dissipated.

Despite unbalances in the aircraft steel supply situation, coupled with the need for more aluminum extrusions, hard alloy tubing and forgings, aircraft builders have boosted plane deliveries sharply. In aircraft steel, considerable success has been achieved through the combined efforts of Dayton and Washington toward reducing the seriousness of problems, only to have new difficulties appear. Orders for cold drawn heat treated alloy steel bars needed for aircraft currently are greatly extended, requiring around six months for delivery from the start of the order. Steel producers have been prohibited until further notice from shipping normalized or heat treated carbon or alloy steels on any commercial warehouse order. A "screening" program on small orders is under way by Dayton aircraft officials, but a "small order" often is a different matter for one company than it is for another firm. The largest user of aircraft alloy steel, a forging firm, consumes less than 10 per cent of total aircraft alloy steel.

Only through constant pleading have steel companies been able to push the electric furnace expansion programs which are so vital to aircraft construction. As of April 1, about one-third of the electric furnace expansion program had been completed. Around 552,000 net tons of new capacity has been added so far.

AN interesting development in the aircraft field is the revelation that the Willow Run plant once more is in a transitional period from which it will emerge primarily as an assembly plant for bombers rather than a manufacturing and assembly operation combined. Manufacturing operations will be moved to other Ford plants wherever possible, including factories in Missouri, Minnesota, Tennessee and perhaps

other States. At the same time efforts will be intensified to subcontract manufacturing and sub-assembly work. As a result, Willow Run manpower needs will be reduced.

Intensive efforts are expected to be made to increase the subcontracting on aircraft engine production by Ford. This decentralizing may include the removal of 5500 machines and large heat treating furnaces.

Sales efforts in the machine tool industry are reported to have been stimulated recently by the industry's realization that a decline from its unprecedented production peak can be expected. Output has not slackened very much yet, but before the end of this year some builders will be looking for new business to keep their plants busy.

IN connection with the Controlled Materials Plan, WPB has a number of changes in procedure in mind, the first of which will be the issuance of CMP Regulation No. 6. An amendment to CMP 1 is being studied which would change numerical quota designations and put allotments on a quarterly basis. Steel producers still are awaiting a decision as to the type of reports wanted on orders and advance commitments. One automobile company has suggested that purchasers of material send a carbon copy of their order to CMP at Washington so those offices will have on hand at all times a compilation showing the orders on hand at various mills.

Production of steel shell cases has progressed to the point where the use of steel is close to the use of brass. These shells are being made in 12 sizes of cases.

The tin plate situation continues to undergo weekly changes. Second quarter tin plate production is expected to be 685,700 tons, with June output of around 220,700 tons, which is about 40,000 tons less than can makers had asked. April output is expected to run 210,000 tons, and in May 255 000 tons.

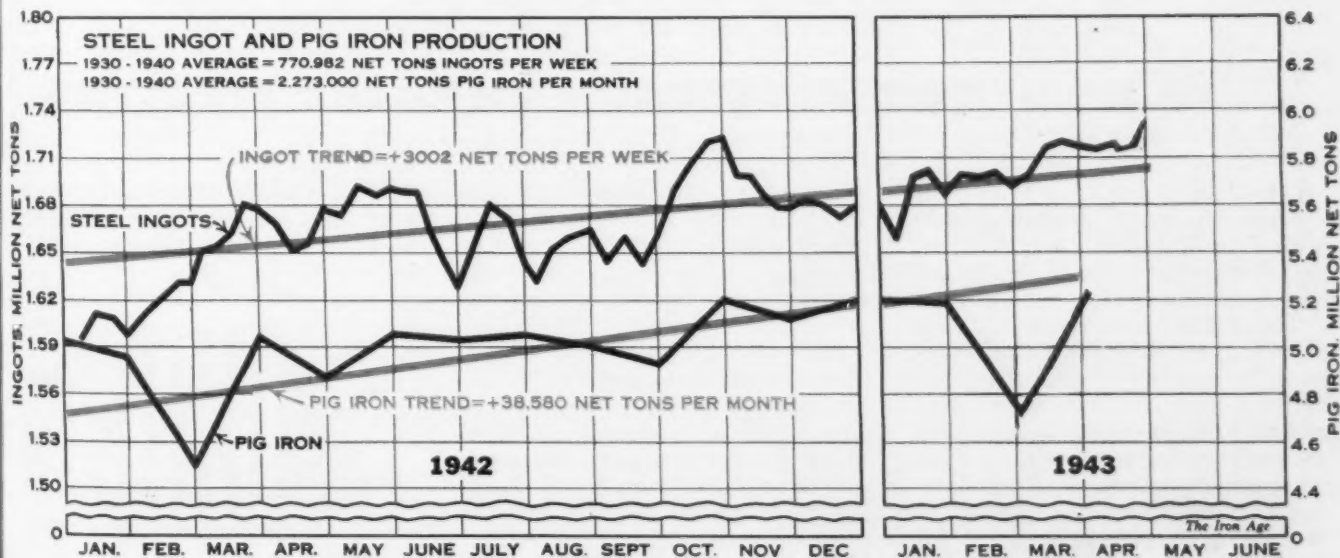
Iron Age Issues New Priorities Guide; "CMP Simplifier" Is One of Many Features

• • • The long-awaited CMP and Priorities Guide is printed as Section Two of this issue of THE IRON AGE. It contains up-to-date lists of current M, L and P orders, an index of PD forms, an exclusive feature known as the "CMP Simplifier" and much other information.

Every copy of the magazine contains this timely 28-page section. If you can't find it, perhaps someone else in your organization has removed it. Extra copies are priced as follows: Single copies, 25c. each; 10 to 25 copies, 20c. each; more than 25 copies, 18c. each.

Please send stamps or coin with orders for \$1 or less. For extra copies, write, wire or telephone THE IRON AGE, Reader Service Department, 100 East 42d Street, New York.

NATIONAL ingot production this week has climbed one point to 99.5 per cent of capacity from 98.5 per cent last week. Operations in the Pittsburgh district are up two and a half points to 102.5 per cent while Chicago has gained half a point to 99 per cent. Philadelphia ingot output has reached a high point at 96 per cent, two points above last week's rate. The Buffalo district has jumped two points in its operating rate to 106.5 per cent. Down half a point to 94.5 per cent is steel making in and around Youngstown and in the Eastern district the rate has fallen five points to 92 per cent. Unchanged at 99 per cent is output at Cleveland. Other districts maintaining last week's levels are Wheeling at 88 per cent, Birmingham at 102 per cent, Detroit at 107 per cent, Cincinnati at 105 per cent and St. Louis at 106.5 per cent.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	S.Ohio River	St. Louis	East	Aggregate
April 22	100.0	98.5	95.0	94.0	99.0	104.5	88.0	102.0	107.0	102.0	105.0*	106.5	97.0	98.5
April 29	102.5	99.0	94.5	96.0	99.0	106.5	88.0	102.0	107.0	102.0	105.0	106.5	92.0	99.5

* Revised

★



★

OWI Photo by Palmer, in an Allegheny Ludlum Plant.

Steel Man with a Mission

.. TO KEEP THE ELECTRIC FURNACES MELTING

ALL of us—men or women—on the job or off it—are people with a mission these days. This war makes common cause for every one and spares no one.

The maintenance-man's job, atop an Allegheny Ludlum electric furnace, is no less essential than that of the crew who operate the furnace, nor than that of the fabricators who use the stainless, tool, valve or electrical steel it produces. Total war demands maximum cooperation on the supply fronts as well as the fighting fronts, and it asks also that every last bit of manpower and materials be used to maximum advantage.

Boiled down to a very few words,

that simply means: *no waste—everybody help.* How can we help you to produce better and faster for war; to stop the loopholes of waste; and to plan your course in post-war production?

For your designers and technicians, complete and certified laboratory data on all Allegheny Ludlum alloy steels are available in "Blue Sheet" form. For your engineers and production men, our "Handbook of Special Steels" contains comprehensive and valuable information; and our "Elementary Discussions," covering Tool and Stainless Steels were developed particularly for training course and student use.

• Write for any printed material that will help you or to request the services of our Technical Staff.

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What Have Management, Labor and Government to Gain by Work Incentives?

• • • Recently a great deal of attention has been focused on piece work pay rates for war industries. C. E. Wilson, president of GM and now vice-chairman of WPB, is reported to advocate incentive payments. The introduction of a bill in Congress has been proposed which would make work incentive plans, such as piece work is presumed to be, compulsory.

On the theory that many readers may be wondering why this subject of piece work has been revived at this time, THE IRON AGE, through its district editors in principal industrial cities, presents the roundup below, a cross-section of the opinions of industrialists and union leaders on the subject.

Fundamentally, the purpose behind both Wilson's and the government's interest in piece work appears to be the belief that it will increase the rate of war production. An aside, not openly admitted, is that it might also reduce the unit cost of munitions and ordnance to the government.

Best feature in favor of the plan from the standpoint of production is that whereas workers can produce as little as possible on a day or hourly rate, piece work increases their zeal on a basis which can only result in more production. Quite as favorable to the worker is the fact that the more units produced, the more pay received,

Work incentives are also discussed in this week's Assembly Line which appears on page 60.

which is a definite incentive to produce. The piece work rate must be fairly established, however.

It is also believed by some that general inauguration of piece work pay rates would in effect permit workers to earn as much as their individual abilities and energy enabled without the restriction of "frozen" hourly wages, thereby favoring the worker with an increased income based on actual productiveness and without requiring wage negotiations to get proper recompense. In effect, a loophole around the "hold-the-line" pronouncement of Roosevelt's.

The sore spot between labor and management on piece work has always been in the establishment of a fair rate. Some firms have been accused of lowering rates when workers seemed to be making too much money. Labor, it appears, has been inclined to ask too low a production rate as the basis of computation. Ne'er the twain shall meet . . . except by compromise.

Most satisfactory method of gaining a meeting of the minds on rates seems to center around the manufacturer establishing the total unit production cost satisfactory for his prod-

uct and what part of that cost is labor. With this established, a base pay per day regardless of production might be set as incentive to come to work.

Labor-Management Problems Seen

Cleveland

• • • Current efforts on the part of management, Congress, and certain nationally known personalities to inaugurate job incentive or piece work plans throughout war industries to help boost production of war materials are likely to be the spark that will touch off a resumption of the bitter fight between management and labor that has so recently calmed down, it is said here. Such incentive systems have been widely used throughout industry for the past 30 years at least, and while management claims that production is increased and costs are cut, the general consensus among workers is that they are unfair, lead to personal rivalries, tend to induce sloppiness and scrap, and lead to cheating by employees.

The latest development along these

Over and above this amount the worker could be paid a set rate per unit which together with the day rate would equal the agreed unit production cost (for labor only).

Since it is production that is wanted, even above savings, such a plan would have the effect of increasing production without affecting the unit cost beyond the agreed satisfactory total and at the same time provide an incentive to the worker in increased income, not subject to bickering.

lines, aside from the bill being introduced into Congress to make incentive systems compulsory, is the stand taken by the CIO-UAW in regard to an incentive pay system proposed by C. E. Wilson of General Motors. The plan was presented this week by Richard T. Frankenstein, UAW vice-president, at a special session of the UAW in Cleveland, held to combat the President's "hold-the-line" order on wages and job stabilization. The plan was shelved, thus emphasizing the union's stand of six weeks ago at Columbus which placed it in opposition to any incentive or piece work pay systems.

The objections raised by the union to piece work or incentive plans are quite numerous. The chief one is that as soon as a piece worker's total wage gets high, the company re-examines

RELATED :

While not exactly the sort of work incentive methods covered in this week's roundup, this Bull of the Woods cartoon was chosen for repeating because of its humorous relationship. Drawn by J. R. Williams. March 20, 1942.



the jobs, makes some minor changes in it, calls it a new job, and then scales the rates downward. Furthermore, it was stated by a union representative that many of the unorganized plants in the country today, especially aircraft plants in the Southwest and West, are working on such systems.

C. E. Wilson's plan calls for an incentive pay system that would be based on the Sept. 15, 1942, production and wage rates, was definitely and unconditionally opposed by the UAW.

In a study of Cleveland plants where incentive systems are in operation, some company officials were vague about specific benefits. In all cases they agreed that production was increased and costs were cut, but with the exception of one company, none could or would indicate actual figures or percentages. All agreed that a given piece of equipment that produced normally a given quota on a day rate if operated on a piece work basis would likely exceed the quota, thus cutting down unit production cost, overhead, administrative and other costs, but from a department standpoint or a plant standpoint none indicated just what the savings were. One company with a bonus incentive plan stated that costs were cut 50 per cent, but on the face of such a statement, it indicates that before the plan was set up costs must have been terrifically out of line.

Two major factors that cause trouble with the inauguration of incentive plans the study revealed: First, too often a plan is adopted that is complicated and the man on the machine doesn't understand it. The second factor is that piece work or incentive rates are inequitable and subject too often to change.

The success of such a plan depends a great deal on its flexibility and fluidity. Where there is a diversity of jobs by a single operator, the system must be set almost by the job, requiring a pretty heavy administrative staff. At present, with the manpower shortage that exists, industrial engineers are at a premium.

Also, for successful operation of such a plant, there can be few or no limitations placed on the system as set up. For example, the CIO-United Steelworkers of America have clauses in practically all contracts with steel companies that incentive systems be based on a daily rather than a period operation. This not only increases the work of the industrial engineering staff, but also makes for laxity and



WOMAN RATE SETTER: Illustrating the lack of men in industrial engineering, Marie Guran is shown as the first woman rate setter in the Reliance Electric & Engineering Co., Cleveland.

loading on the job. In fixing a rate for a job, normal delays are figured into the time. If an operator happens to hit two or three days of good luck,

without even normal delays, he will turn out a heavy volume of work and collect the bonus. However, if on the fourth day he runs into trouble, there is no point to his rushing to get back into incentive production. Now, if unions permitted averaging the production time over a period, such as a week, a pay period or a month, delays and fast operations would average themselves out so that the worker would have to keep up his speed to collect his incentive pay or bonus.

Probably the best indication of the acceptance, value, benefits, ills, and shortcomings of any incentive pay system can be had from workers who have been employed under both incentive and measured day or "honor" systems. On the whole, they do not like incentive plans. In an examination of some 225 letters of workers who at one time or another worked on a piece work basis or worked in shops that had incentive systems, less than 1 per cent indicated that the workers preferred that basis for pay.

The chief objection was that as soon as a man exceeded his base and began to really get into a good bonus range, the base number of pieces was increased and the rate was cut.

Incentives Advocated With Reserve

Pittsburgh

• • • General tampering with, instead of specific handling of, wage incentives would only serve to further complicate a problem which already is receiving maximum attention from management and unions, it is said here.

Consensus here is that incentive wage payments are a good thing, but should be installed only where capable of actually increasing production. The problem varies from industry to industry, and from job to job. Generally speaking, the steel industry has incentive payments almost 100 per cent in the primary steel departments such as open hearths, blooming mills, and finishing mills. Attempts have been made recently to extend incentive payments to processing departments, as well as maintenance and repair groups.

At present, probably 50 per cent of the vocations in the steel industry are covered by incentive setups which are either tonnage rates, piece rates, or a partial combination of both. The situation is not uniform from company to company, some covering 25 per cent of their jobs with incentive rates, while others cover as many as 70 per cent.

Both management and the unions agree on the major question of the need for incentive rates. Lack of a common understanding is due many times to suspicion on both sides, some of which is a "hangover" from past malpractices on the part of both. Most companies feel that their actions are just and equitable in setting up incentive plans, while the unions are just as certain that they are being "hooked" in some cases. The unions have lost sight many times of the cost factor in setting up incentive wages.

From the employee's standpoint, an incentive rate will often increase production and thus earnings, but at the same time makes the employee more vulnerable to sharp up and down swings in production and hence earnings. This occurs regardless of a basic guaranteed rate. In the steel industry, as well as other industries, probably most grievances can be traced to alleged inequalities in rates, which is closely tied in with incentive plans.

It is problematical if a greater coverage of the steel industry by incentive rates would increase production very much, at least in those cases involving existing equipment.

Pay Incentive Increases Engine Output

New York

• • • The Wright Aeronautical Corp., Paterson, N. J., has had a group incentive plan in operation since 1930. Under this plan, bonus earnings have improved with increased worker effectiveness until the employees are now earning at the rate of 130 per cent with 100 per cent being the level set by the time study standards. Industrial engineering statistics have proved that factories without a wage incentive plan operate at 70 per cent efficiency.

One of the fundamental principles of the incentive program as it operates at Wright is that each department functions as a team. Every operator must contribute his best efforts in helping his co-workers to increase production. Because of this unit idea, no individual will push through bad work since that might slow up some other member of the department to the disadvantage of all. The management of the company is convinced that the incentive plan has

not only increased the rate of output, but has helped decidedly to increase the quality of the product and to reduce substantially the scrap produced.

Every employee who contributes directly to the production of engines shares in the increase in earnings. Operators receive in bonus the full amount produced above the task set by the time study standards. Even a learner after being with the company 8 or 10 weeks shares in the bonus of his group.

Non-productive departments have asked to be included in the group wage incentive plan. Tool cutter grinders, the experimental machine shop and the service overhaul shop are now operating under this plan.

Accurate time studies have to be made before a department is placed under the plan. With a time standard for every operation, the Wright Aeronautical Corp. has found that it could not only increase output, improve quality and decrease scrap, but that it had available a yardstick for careful planning of the expansion of the company's productive facilities.

increased effort of workers should not result in a lowering of hourly and insured of a 40-hr. work week to avoid layoffs resulting from poor managerial scheduling of work, and that the base for normal production should be related as of September, 1942, when the first Executive wage freezing order was issued.

On the Pacific Coast CIO has been more outspoken and aggressive in encouraging incentive payment plans. Unions affiliated with AFL have tended to follow a national line and adhere to traditional opposition to any incentive plan.

In September, 1942, following careful surveys, time studies and workload analyses, an incentive payment plan was introduced at the East Bay plant of the Inland Steel Container Co. This plant is organized under the CIO steel workers and a representative of the union participated in the preliminary cost and factual studies. Both workers and management are reported satisfied with the results and it is understood basic production has doubled in seven months. Four surveys are at the present time in progress in four other plants and a trial incentive plan is operating on a provisional basis in another plant. Industrial relations men agree that the going wage of the locality should be the basis adopted and that a base of production should be carefully considered.

In general the WLB has so far insisted that an incentive plan must not increase costs and cannot be used as a basis for a higher selling price.

Incentive Plans Are Granted Poor Chance

San Francisco

• • • On the Pacific Coast shipbuilding and aircraft production are the predominant war industries, and because of the master wage agreement adopted for shipbuilding in May, 1942, under official government wage and hour sponsorship, there is little or no opportunity for the application of an incentive or production bonus plan to shipyard workers. Moreover, shipyard management feels that wages and rates of pay are now sufficiently high to provide maximum incentive.

In aircraft, the extent of the industry on the Pacific Coast, its incidence with and competition for labor from shipyards and the fact that the Federal government is the chief customer as well as the official umpire in labor-management relations seem to combine to minimize the possible adoption of an incentive plan in the airframe industry.

The California CIO Council in a statewide meeting April 3 and 4 endorsed in principle the incentive payment plan for the object of attaining maximum production. The Council recommended that any satisfactory agreement must be between an individual employer (or employers grouped in a single locality and with

a single product) and the union incentive rates, that employees be involved. The Council opposes participation by a government agency or any collective bargaining proposal on a national basis. It is further stipulated by the CIO Council that any agreement must be simple, that the



PROGRESS REPORT OF BONUS PERCENTAGES: At the Wright Aeronautical Corp. output has climbed steadily since the group wage incentive program was introduced. In 1930 when the program was first started, employee effectiveness was set at 70 per cent. Twelve years later it had lifted 60 per cent to 130. The decline in 1939 was caused by the hiring of a large number of apprentices. As this green help became more experienced, production continued its upward trend.

Removal of One Jam on Aircraft Steel Reveals Appearance of Others

By DON JAMES

News and Markets Editor

Washington

• • • The prayers of far-off soldiers for more American planes, whether they know it or not, are directed toward the nerve center of the entire airplane industry at Dayton, Ohio—the Army Air Forces Materiel Command. There is where the controls are gradually being worked out to guide the flow of raw materials, of steel for instance, from the mill to the end-product, the airplane.

Out of all the hundreds of units set up at the Materiel Command, which at first glance may confound the observer, the one which probably comes in closest contact with the steel industry is the Production Division, Materiel Command, Production Resources Section, operating for the Aircraft Scheduling Unit. Two principal functions are:

(a) To estimate the amount of raw materials needed to meet the various aircraft programs.

(b) To allocate and schedule the deliveries of these materials to contractors, once the total allotment has been made by WPB.

This last function has been changed by the advent of CMP, as to controlled materials, but allocation and scheduling activities are being maintained for a number of non-controlled materials.

On this section falls the responsibility of actually operating the Controlled Materials Plan for the airplane industry. On behalf of the Aircraft Scheduling Unit, which represents the Army, Navy, and the British, it gathers the data from manufacturers as to the amount of materials they will need. When compiled and analyzed these constitute the total requirements for the industry and in turn their requirements are submitted to WPB's Controlled Materials Division, which submits them to the Requirements Committee, WPB. Upon these requirements WPB bases its decisions and subsequently makes its total allotment back to the Aircraft Scheduling Unit. Still operating for ASU, the Production Resources Section allocates this WPB allotment to the aircraft industry as represented by its manufacturers.

Even before CMP, however, the Production Resources Section had already proved that the never-ending "bugs" in the program can be cut down. Critical shortages of materials have been reduced from about 6000 cases awaiting disposal last July to only 470 in the middle of March.

This success largely has been achieved by giving the Materiel Com-

mand's four district procurement offices in New York, Detroit, Wichita, and Los Angeles increased responsibility in handling these shortages. When the district office finds itself unable to cope with a shortage problem it appeals to Dayton.

In spite of this marked improvement in procedure, as fast as old wrinkles are ironed out, new ones appear, and again, sometimes old ones reappear.

Take the problem of alloy steel. Its importance cannot be overstated, for it has the longest time cycle of production of any basic aircraft material. From the filing of an order until delivery of alloy forging bars and billets requires around four months, while cold drawn heat treated bars require around six months. To get delivery from the time the requirement originates requires even longer, of course.

A big jam exists in cold drawn heat treated alloy steel bars. This will be eased a little by the current start of operations at two new plants. A screening program on small orders for cold drawn alloy steel bars is under way by the Steel Division of WPB and Aircraft Scheduling Unit. They are sorted over and combined, and placed where they can best be produced. A huge slice, estimated at about 12,000 tons, of one mill's 72,000 tons of unfilled orders was scheduled to be given to one of the new plants.

It is interesting to note that the largest user of aircraft alloy steel, a steel forger, uses less than 10 per cent of total aircraft alloy steel, with the second user consuming around 4 per cent. The ten largest consumers use 36 per cent.

As outlined in THE IRON AGE March 11, through an investigation which culminated in a report Feb. 13, it was found there are many items of aircraft alloy steels that are delinquent as to delivery. Causes for these shortages included late ordering; ordering in too small quantities for mill production; improper scheduling of orders as to date desired; failure to notify producers promptly when shipments should be delayed or cancelled; failure to place orders with mills best qualified to produce; faulty operation of the priorities system which forced mills to accept more orders than could be handled; inaccurate coding of orders; requesting delivery earlier than actually needed for end product; lack of adequate check on actual products shipped.

Corrective measures are being taken jointly by WPB and ASU with the likelihood that many of the evils will



Standards Studied; Directive 16 Issued

Washington

• • • Uniform standards for the substitution of materials in aircraft construction are being developed cooperatively by the Army, Navy and WPB. This is being done under the direction of the Operating Committee on Aircraft Materials Conservation of the WPB Aircraft Production Board.

A move which will speed the production of airplanes by making it possible quickly to transfer materials and parts from the inventory of one manufacturer to another, was announced April 24 by WPB. Directive No. 16 places in the hands of the Aircraft Scheduling Unit authority to effect such transfers. It removes from the effect of Priorities Regulations 1 and 13 approximately 400 plants and places them under control of the Aircraft Resources Control Office and the Aircraft Production Board.

be corrected. Steel producers have been instructed to segregate all aircraft alloy steel orders when submitting their proposed schedules into "In" melting schedules. Tonnage that must be melted for delivery in the next two or three months are included in the "In" schedules, while orders for later delivery make up the "Out" schedules. Each monthly "In" schedule for all alloy steel consists of about 3000 pages, each containing about 20 orders.

While a close check on inventories was recommended, it was not feasible to make. ASU did send out officers to do a "screening" job. They visited the largest aircraft alloy steel users east of the Mississippi River and obtained deferment out of the March and April melt of steel not actually needed at once. About 6500 tons of steel not immediately needed was moved out of the March schedule and replaced by orders for which there was a greater need. This was achieved through cooperation of the Steel Division, WPB; Bureau of Aeronautics; ASU and the Districts.

The pooling of small orders was recommended, but faces difficulties. For one thing, a "small order" for one steel company is a different matter than a "small order" for another steel firm.

With the stocking of 26 designated warehouses and closer controls over

various phases of production through the co-operation of all governmental agencies concerned, a much better picture on materials can be, and will be achieved.

In addition to alloy steel problems, there are countless others calling for attention, i.e.:

The need for more aluminum extrusions, hard alloy tubing, and forgings to overcome the lag in airframe construction is most pressing at the moment.

The lack of facilities on the West Coast for heat treating parts is another complicating factor.

Finally, as to the new electric furnace steel capacity, the truth of the matter is that the expansion program has had a difficult time because of loss of equipment to the aluminum, synthetic rubber and gasoline programs through low priorities; delays in getting electrical equipment such as controls; loss of time through dealing with the Defense Plant Corp., labor trouble and other factors. One of the biggest electric furnace expansion programs, scheduled originally for completion last December, will barely be operating next July. Electric furnaces at another plant have been on hand for some time, but are useless because of the lack of auxiliary equipment.

Only through constant pleading have steel companies been able to push the electric furnace expansions whose need they so keenly appreciated. In April or May several new units were scheduled to start operat-

PLANE WITHIN A PLANE: The body of a dismantled British P-40 Warhawk is fastened inside a spacious U. S. Douglas C-47 Skytrain transport.



ing, and by late summer considerable new capacity may be available if all goes well.

One of the broader problems which has confronted the Production Resources Section, has been obtaining the wide variety of data necessary from the aircraft companies. Why so much confusion should exist in records of certain aircraft companies is a constant source of wonder to many persons outside the industry, who apparently overlook the fact that rapidly expanding organizations faced with the pressure and problems which confront the aircraft field, can hardly be expected to have the experienced personnel and precise methods which older companies have developed over many years.

Turning out planes, despite all obstacles has, after all, been the primary job of these suddenly bloated companies, and it is small wonder that their inventory position is difficult to identify. One Eastern aircraft firm

Press Assn., Inc.



began an inventory survey last November and is still at it. Furthermore, even though numerous government definitions have been issued, there is still debate over what an inventory is—some companies say they have none, yet they are known to have several months' supply of work in process.

With the introduction of CMP the need for skillful handling of data becomes even more important because not only must the contractor submit requirements to ASU, but he in turn must collect and compile such data from his subcontractors. It is said in some quarters that closer control and better scheduling are needed over secondary processing, such as forge shops, cold drawing mills, and elsewhere, similar to the plan for allocating steel tubing for aircraft. Under this plan buyers submit requirements covering size, shape, grade, mill preferences and required delivery schedules to the Production Resources Section which designates specific tonnages according to producing mill and buyer.

CMP will swing into full operation in the aircraft field a little later than expected. The old system was found necessary for April allotments of aluminum, while steel and copper deliveries for April and May were covered by PRP allotments due to the fact that the allotments were made too late to get on the mill schedules for those months, in many instances.

Meanwhile, airplane companies are understood to be making as many substitutions as they can to help themselves. The use of NE-8630 for

Designers Over Nation Work on Helicopters

Detroit

• • • Virtually all aircraft companies are reported to be developing helicopters in an ultra-secret atmosphere for submission to the Army. The post-war market is considered particularly attractive. If they can be made in large volume, they may be sold competitive with small automobiles. Helicopters now on the design boards have little metal beyond the engine, the prop and the transmission. The cabins are largely plastic. The size is small, for two persons, usually.

SAE-4130 alloy steel is permitted. Substituting hot rolled steel for cold drawn is done wherever possible. Commercial tolerances sometimes are employed instead of those originally specified. Using machined bar stock or castings for forged parts is sometimes resorted to. One drawback in the use of substitute alloy steels is the price factor, according to some plane makers, who say they are asked to pay more for certain forms of the NE steels than they paid for the SAE steels of high alloy content.

Contributing largely to the great strides that have been made by the ASU and Production Resources Section in smoothing out the entire program is the ever-increasing cooperation between the Army, Navy, WPB,

and the manufacturers themselves. Assisting Production Resources Section in its work for the ASU are 41 Navy officers assigned by the Bureau of Aeronautics.

The ASU is also aided by liaison officers representing it in Washington, in the CMP Divisions, WPB.

Batcheller to Speak At Iron & Steel Meeting

Pittsburgh

• • • Hiland G. Batcheller, director, War Production Board's Steel Division, will address the Association of Iron and Steel Engineers at its annual spring conference here, May 10.

Mr. Batcheller will discuss some of the problems in the development of the steel expansion program.

Other speakers at the spring conference, which is sponsored by the Association's Rolling Mill Committee, will include Joseph Sparks, Swindell-Dressler Corp.; Ralph Wright, Westinghouse Electric & Mfg. Co.; H. H. Talbot, United Engineering & Foundry Co.; Alex Montgomery and J. B. Holbrook, Carnegie-Illinois Steel Corp., and O. A. Bamberger, Republic Steel Corp.

Furnace Which Made Nearly 3,000,000 Tons Now Blown Out

Chicago

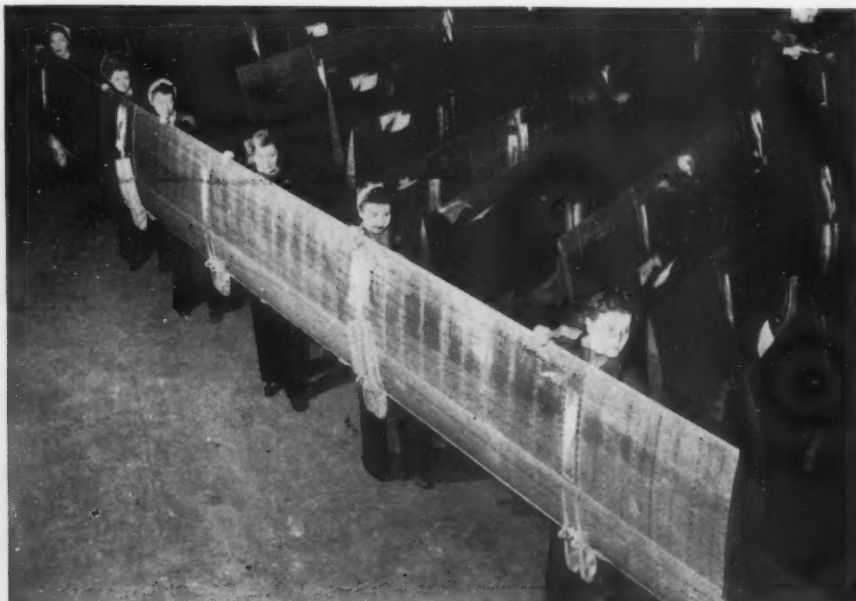
• • • After a record performance for the Chicago district of Carnegie-Illinois Steel Corp., one of the string of 11 blast furnaces at the Corporation's vital South Chicago plant is being completely relined for the first time in seven years.

The furnace, No. 8, was blown in March 29, 1936, and, with the exception of minor mechanical repairs, has been in constant operation until a week ago. Its output of iron neared 3,000,000 tons during the seven-year period.

CMP Division Shifted In Reorganization at WPB

• • • Reorganization of the Office of Program Vice-Chairman of WPB was announced April 24 by Vice-Chairman J. A. Krug. Under the new arrangement, there are four bureaus—program, production controls, orders and regulations, and distribution. The CMP Division is removed from the distribution bureau and placed in the new production controls bureau, headed by Harold Boeschenstein.

EAGLES' WINGS: Completed wing 'flaps for the Liberator bomber ready for inspection in a Berger plant of Republic Steel Corp.





THE STRIKING POWER OF BRONZE

It is a long way from Bellefonte, Pa., to North Africa. But it is safe to say that vital parts made of brass and bronze by the Men of Titan are contributing to the striking power of America's fighting equipment.

The properties of brass and bronze in their various alloys are augmented by the quality born of Titan experience.

Again, as during World War I, Titan production is devoted to winning this war.

But the Men of Titan also look ahead to peace-time when their backlog of metallurgical experience will again help manufacturers of products whose "end use" is to make America a better place to live.

Manufacturers and design engineers are invited to put their non-ferrous metal problems up to the Men of Titan.

TITAN METAL MANUFACTURING CO.
BELLEFONTE, PA.

A Great Name in Bronze Since 1915

BRASS AND BRONZE RODS, FORGINGS, DIE CASTINGS, WELDING RODS





WILL YOU BE A WAR CASUALTY?

Many American manufacturers are making tremendous profits today . . . profits far out of proportion to anything they enjoyed during peacetimes.

It is a question whether many know why they are making so much money.

Some are "patting themselves on the back" for their efficient management. Many who could not much more than break even on their prewar operations find that their present three-shift operation . . . most likely because of a one-shift break-even point . . . yields a very high profit.

But during wartime, profits are not necessarily a measure of efficiency. All of the inefficiencies which were responsible for low profits during peacetimes may be waiting to crack down like Mar's broadsword when the war is over.

Take full account, therefore, of your operations NOW . . . know your profit-volume relationships . . . subject all of your controls to a fine-tooth comb inspection . . . get your house in order for whatever may come.

★ ★ ★

Just as my organization has helped our clients with their war conversion problems, so will we help smooth the way for peacetime operations.

Geo. V. Trundle Jr.
President

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

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Briefly Told

**54-Hr. Week Schedule;
20,712 Freight Cars
On Order; Other News**

• Class I railroads on April 1 had 20,712 new freight cars on order, the construction of which had been authorized by WPB, according to the Association of American Railroads. On the same date last year, they had 69,515 on order.

• Absenteeism resulting from sickness, non-industrial accidents and personal reasons caused the loss in January of 39,400,000 man days, according to an estimate made by the Management Research Division of the National Industrial Conference Board.

• The United States Maritime Commission has undertaken a survey of post-war shipping problems based on world trade conditions expected to exist after the war.

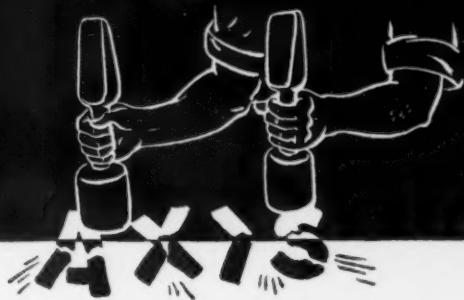
• Factory building costs during the first quarter of 1943 remained practically at a constant level, with little or no variation from costs during the final three quarters of 1942, according to the index computed quarterly by the Austin Co., Cleveland.

• Bell Aircraft Corp. has put its Niagara Falls plant on a 54-hr. week schedule for all employees in manufacturing departments. Working a 9-hr. day, six days a week, with Sunday off, the departments affected will gain six man-hours per individual.

• Twelve thousand tons of metal construction and three years' normal work will be necessary before Stalin-grad's 200-acre Red October metallurgical works can resume normal operations. Acting Chief of the Steel Trust, Lenau, declared that it would be producing rolled steel within the year.

• A Baltimore shipyard welder, accused of sabotaging vessels under construction by doing faulty work, recently was sentenced to a year and a half in prison. Federal prosecutors said this was the first such case in the nation.

• Dan Hammill and Herman Hummell, Curtiss-Wright, Buffalo, have developed a collet fitting into the



Situation **WELL IN HAND**

Our quality sand and permanent mold aluminum castings are helping many producers of finished and semi-finished war materials to keep the "Situation Well In Hand" on the production front. Over thirty years of experience, thorough research, careful supervision and unmatched craftsmanship have made us one of the largest producers of sand and permanent mold aluminum castings. TENUAL Aluminum Castings are meeting today's demands—assuring tomorrow's needs.

TENUAL

ALUMINUM CASTINGS

Photograph shows one of our battery of squeezer machines. Man is using hand tampers. With speed all important these days, squeezer machines are playing a vital part in the mass production of castings.



BUY U. S. WAR BONDS & STAMPS

THE NATIONAL BRONZE & ALUMINUM FOUNDRY CO.

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NEW YORK—111 Broadway • CHICAGO—100 W. Randolph • DETROIT—Stephenson Bldg. • LOS ANGELES—405 S. Hill

MAKERS OF QUALITY SAND AND PERMANENT MOLD ALUMINUM CASTINGS

Picking Up

THE THREADS THAT WERE BROKEN!

- With the Jap attack on Pearl Harbor, the normal threads of your business were broken.
- You will never again pick up those same threads.
- Whether the war lasts 2 years or 5 years, every day ages your product and your plant, and changes the buying habits of your customers.
- But the thing that is happening to you is also happening to your competitors.
- You may have gone into this war period on about an equal basis with them. What your relative positions will be when you come out of it will depend on the planning you do now for the competitive days of Peace.
- This war's end will see more stainless steel equipment used for economy in operation and for improvement in product. In many plants the dollars available for stainless equipment will be *stretched* by the generous use of IngAclad Stainless-Clad Steel.
- This Borg-Warner Product with a 10-year record of success gives complete stainless protection on the side that is used, and makes your stainless dollars go much further.

Prepare now to "pick up the threads that were broken"

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
 310 South Michigan Avenue Chicago, Illinois
 Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

Makers of **INGACLAD** STAINLESS-CLAD STEEL "A Borg-Warner Product"

Conserving Vital Alloys for War and in Peace
 Note: We Also Produce

INGERSOLL SOLID STAINLESS STEEL

BRIEFLY TOLD

chuck that enables workers to use broken bits as short as 1 in. in portable drilling equipment.

• Rubber is being used in a new-type large size electrical cable developed by American Steel & Wire Co., U. S. Steel subsidiary. The semi-conducting rubber permits transmission of higher voltages for operation of X-ray machines and heavy industrial equipment.

• Ford Motor Co. announced that airplane engine production will be quadrupled under an additional government contract for \$34,303,773. The new contract is said to make Ford the largest producer of heavy horsepower aircraft engines, the work being on 2000 hp. Pratt & Whitney motors.

• Keystone Steel & Wire Co. reports for the three months ended March 31, the third quarter of the company's fiscal year, net profit of \$220,854, after all charges.

• To help solve the perplexities of war time material regulations, a group of officials from Milwaukee industries have formed the Milwaukee Priorities Association. They meet regularly on alternate Thursdays.

• Two new motion pictures which will facilitate the training of war workers and technical personnel of the armed services and give the public an understanding of aluminum, have been released for distribution by the Bureau of Mines.

• Employment in the Canadian primary steel industry has shown a jump of more than 100 per cent since the outbreak of war, according to a government report. At the close of 1939 total employment in the primary steel industry of Canada was 13,800 persons, while in the latter part of 1942 this total had increased to 26,800.

• M. A. Hanna Co., Cleveland, reported consolidated net income of \$854,056 for three months ended March 31, after all charges.

• To assist broach users in increasing the efficiency of the broaching set-ups and to conserve vital tools, Colonial Broach Co., Box 37, Harper Station, Detroit, has prepared a poster-folder entitled "Broaching Do's and Don'ts."

• The new Danish steel works, the Frederiksvaerk, Seeland, has been seriously damaged by fire of unknown origin. Substantial parts of the works have been put out of commission; rebuilding will begin immediately.

STOP

LUBRICANT "ABSENTEEISM"

WITH



Lubricant, like manpower, is worthless unless it is at the right place at the right time. It must be kept in the bearing it is to lubricate.

"Perfect" oil seals stop lubricant "absenteeism" by keeping lubricant in the bearings. In addition, they keep mud, grit and other destructive foreign matter out of the bearings, thus keeping the bearing on the job.

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BASOLIT PICKLING TANKS



CONSTRUCTION: Reinforced concrete shell double brick-BASOLIT lined, with brick coping over top of concrete shell.

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LEAK-PROOF
EVERLASTING ECONOMICAL**

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NUKEM PRODUCTS CORPORATION
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NEWS OF INDUSTRY

Welder Advocates Lower Safety Factor In Building Ships

• • • Welding of America's Liberty ships, which already has greatly speeded up their construction, eventually may bring about a cut in the necessary design factor-of-safety with a consequent reduction in weight and cost, according to M. H. MacKusick, welding engineer for the California Shipbuilding Corp., in a recent letter to the Lincoln Electric Co., Cleveland.

Since the failure of the tanker "Schenectady," there has been a great amount of argument over the dependability of welded construction for ships, and the cry of locked-up stress in a welded ship has been presented as an argument against the extensive use of welds. Few people stop to realize, Mr. MacKusick wrote, that any piece of cold-formed steel is

See story on amended strip mill plate specifications adopted by Navy, page 115.

stressed above the yield point during fabrication, yet such yield point stresses have never seemed to cause concern. Furthermore, the strength or tightness of a riveted joint depends considerably on stresses established in the rivet when it cools from high temperature.

Samples of welds removed from sections of welded ships may be bent through 180 deg. without causing the welds to fail; but a riveted joint subjected to a bend of only a few degrees would most certainly leak badly and would fail entirely through the rivet holes if subjected to a U-bend test.

MacKusick pointed out that local locked-up stresses do exist in all welded structures. When these are subjected to changing load stresses

COMING EVENTS*

April 28 to 30—American Foundrymen's Association, St. Louis.

April 29 to 30—American Institute of Mining and Metallurgical Engineers, Cleveland.

May 10 to 12—Mill Supply Convention, Cincinnati.

May 17 to 18—National Association of Sheet Metal Distributors, Cleveland.

May 17 to 19—American Gear Manufacturers Association, Rye, N. Y.

June 9 to 10—SAE War Material meeting, Detroit.

in service, the local points of higher stress gradually adjust themselves.

"If the problem of corrosion can be completely solved, the design factor-of-safety for welded structures should be decreased with a consequent reduction of cost and weight. The structural design, however, would have to be carefully worked out to eliminate all sudden changes in continuity, such as so often exist adjacent to the integrally welded deckhouse-midships, where working stresses are at a maximum.

Each Liberty ship constructed at the California Shipbuilding Corp.'s yard consumes 135,000 lb. of arc welding rods, or 230,000 ft. The yard, completing 15 ships every month, employs 6000 manual welders and 160 Unionmelt operators. Every three shifts, a 65,000 lb. carload of welding electrodes is used.

So far as practical, the welding is done on sub-assembled sections of the hull in a manner that provides a maximum of flat position welding. The large assembled sections are then erected and fitted on the shipways where the hull is finally welded into a complete structure. The largest single assembly now being made in the Calship Yard is the forepeak section which weighs 57 tons.

In the fabrication shop practically all the welding is done "in position" to provide for the use of large diameter electrodes and heavy welding current. The manual welders in this shop average slightly more than 12 ft. per man-hour. In the sub-assembly shop, where more vertical position welding is done, they average about 8 ft. a man-hour.

There is quite a large amount of vertical and overhead work done on the shipways. Much of this is in confined spaces, such as double-bottom tanks. There the welders are able to average only about 4 ft. per man-hour. The advantage of sub-assembly and position welding is thus obvious.

Experts Testify on Plate Specifications

• • • Minutes have been released covering the WPB Steel Division's meeting April 8 upon the subject of testing steel plates. Remarks by Dr. R. E. Zimmerman, chief metallurgist of United States Steel Corp., were termed invaluable for use by the committee which now is studying specifications with a view toward possible revisions. Others who gave valuable testimony at the meeting included B. F. Fairless, Donald M. Nelson, H. G. Batcheller and Admiral Vickery of the Maritime Commission.

Dr. Zimmerman read a report which presented evidence substantiating Mr. Fairless' earlier claim that the failure of the tanker Schenectady cannot be attributed to the irregularities of plate testing at the Irvin Works. The report also pointed out that 100 per cent precision and reproducibility are rarely attainable in the testing of steel and that, even in the opinion of the services, there is room for the exercise of reason and judgment; that there is always the question of how much material is accurately represented by the samples chosen for test; that, since complete uniformity in steel is hardly attainable because certain factors operate toward a degree of non-uniformity, the need arises for a practicable range in the specification of properties; that in the matter of producing steel best suited for the construction of ships by welding there is a conflict of principles among the naval architect, the welding engineer, and the metallurgist; that such conflict suggests that there must be some give and take in arriving at the best compromise as to the

ROEBLING Wires

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SHAPED WIRES

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Wires
THAT ANSWER
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Action

ROUND WIRE FOR
AIRCRAFT HYDRAULIC
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Wire that is used in the manufacture of hydraulic controls for

aircraft landing gear must meet the most rigid specifications U. S. Army Air Corps engineers can devise. Drawn to very small diameter, it must measure up in roundness, strength, temper, dimensions, finish... And it must be produced in great quantity to meet the needs of our broadening air fronts.


Filling the bill on jobs like this is nothing new for Roebling Wires. Made in a wide range of shapes, sizes and analyses to specifications, these round, flat and shaped wires have been answering industry's call to action for years. Answering it right, too, for these wires are ready as received to go into your final fabricating operations.

If you have a problem in wire, refer it to Roebling experts. We have the varied experience needed to solve today's wire problems—and the broad facilities to translate those solutions into finished wires fast. Prompt action on war orders.



JOHN A. ROEBLING'S SONS COMPANY

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Warning to all plants:

Beware of the Dust Saboteur—a dangerous character at times, and destructive more often than not.

He's a vandal at heart. Delights in undermining health, ruining machinery and slowing up production. Must be humored on occasion because of a Jekyll-Hyde temperament that frequently cloaks valuable qualities.

Should be placed in solitary confinement without fail and at the earliest possible moment.

If you find this criminal roaming your plant report to us. Our men will trap him for you, because they are experienced in dealing with desperadoes of this kind.

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HIGH EFFICIENCY
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The New Iron Age Guide; Up-to-Date, Simplified

• • • It's in this issue and ready to use . . . the new **IRON AGE Simplified CMP and Priorities Guide**, a boiled down collection of the vital facts of both **CMP and Priorities**, tailored to fit your field and indexed to put the facts under your finger.

The **CMP Simplifier** is a brief version of all the important steps and requirements of **CMP**, arranged alphabetically and topically. It is an integral part of the **Guide**. See the **Guide** included with this issue and then send your order for extra copies, priced as follows: Single copies, 25c. each; 10 to 25 copies, 20c. each; over 25 copies, 18c. each. For orders of less than \$1 please send stamps or coin.

specification for the desired physical properties; and that in the light of recent developments it is not unlikely that a renewed understanding of what the specifications should set out is needed.

Admiral Vickery agreed with Dr. Zimmerman that the whole problem of specifications should be carefully reviewed. Although the tests of the steel at the Irvin Works fell slightly below the specification, and as far as the tensile stress was concerned the material would have been accepted, he said, had the deviation been reported to the Maritime Commission. Probably a combination of circumstances, principally with respect to welding stresses, caused the failure of the tanker *Schenectady*, he asserted. Admiral Vickery further said that he was in agreement with the report of the technical committee of the American Bureau of Shipping as to the cause of the ship's failure.

Production and Sales by Steel Co. of Canada Drop

Toronto

• • • Production and sales by the **Steel Co. of Canada Ltd.** in the first three months of this year failed to equal the total for the same period of 1942, **Ross H. McMaster**, president, stated. This was due principally to the reduced tonnage of semi-finished steel available and to stoppages for repairs which became necessary in some departments where operations have been continuous since the beginning of the war. Operations also were hampered by severe weather of the past winter. However, with the additional capacity provided by the new electric furnace, scheduled to go into operation next month, the aggregate tonnage of steel produced for the whole of 1943 is expected to exceed that of the previous year by a fair margin, the president stated.

Postwar Outlook Held Good for Cast Aluminum

Chicago

• • • Technological advances in the recent past, plus the natural advantages of aluminum, have placed aluminum castings in a far better competitive position for after the war markets than is generally realized, L. E. De Groat, sales manager, Permold Co., Medina, Ohio, told reporters during the one-day meeting of the foundry division of the Aluminum Association held here last week. He served as chairman of the meeting.

Other foundrymen at the meeting predicted that secondary aluminum would play a far more important role in postwar markets than is generally expected. They pointed out that under the stress of the drive for greater aluminum supplies, new methods of control and treatment have been developed which greatly extend the field of use of secondary metal.

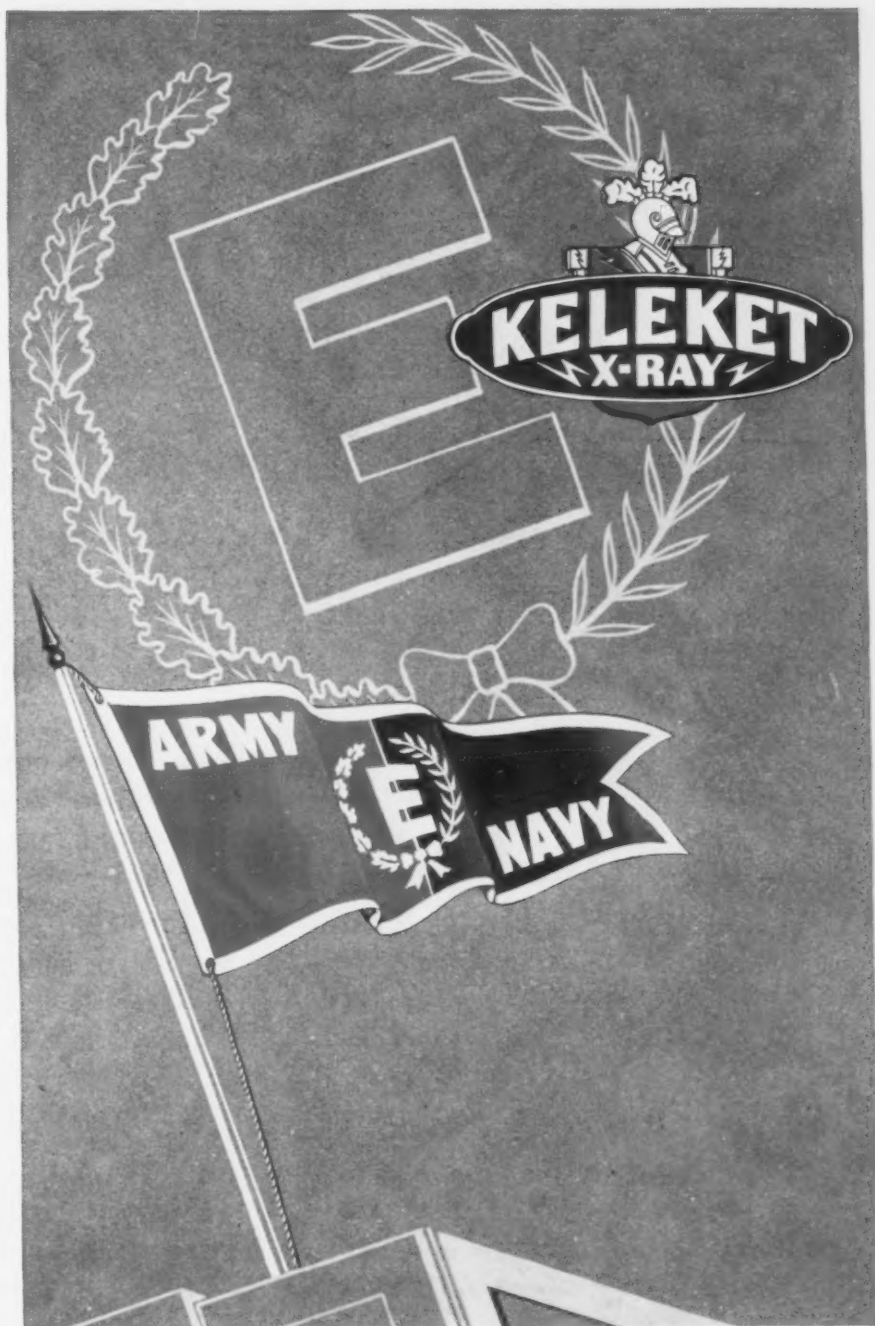
One large foundry operator insisted that in a certain important aircraft casting he could obtain the same physicals with secondary as with virgin, except with respect to elongation characteristics which seemed to favor virgin metal.

In addition, it is expected that a price differential will develop again between secondary and virgin, when present artificial government controls are removed.

The one-day session was sponsored by the aluminum foundry division of the Aluminum Association to discuss new government regulations. Approximately 125 executives attended.

The possibility of forming a permanent committee to represent the industry in Washington was discussed at some length. It was decided to ask all members of the industry to forward their views on the subject to K. G. Castleman, secretary-treasurer, Aluminum Association, 420 Lexington Avenue, New York. If sufficient support of the idea is indicated in these responses, steps will be taken to form such a committee.

Speakers at the meeting included Frederick Ayer II, chief of the castings section, Aluminum and Magnesium Division, WPB; Albert Butler, statistical expert, Aluminum and Magnesium Division, WPB; J. D. Sumner, price executive, Non-Ferrous Metals Branch, OPA; O. S. McCorison, chief of the fabricated and manufactured products section, OPA; J. B. Meier, chief of foundry unit, Non-Ferrous



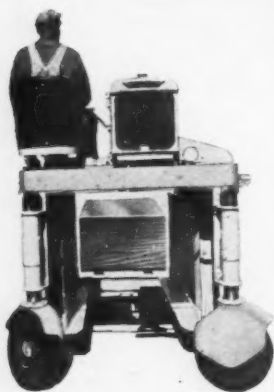
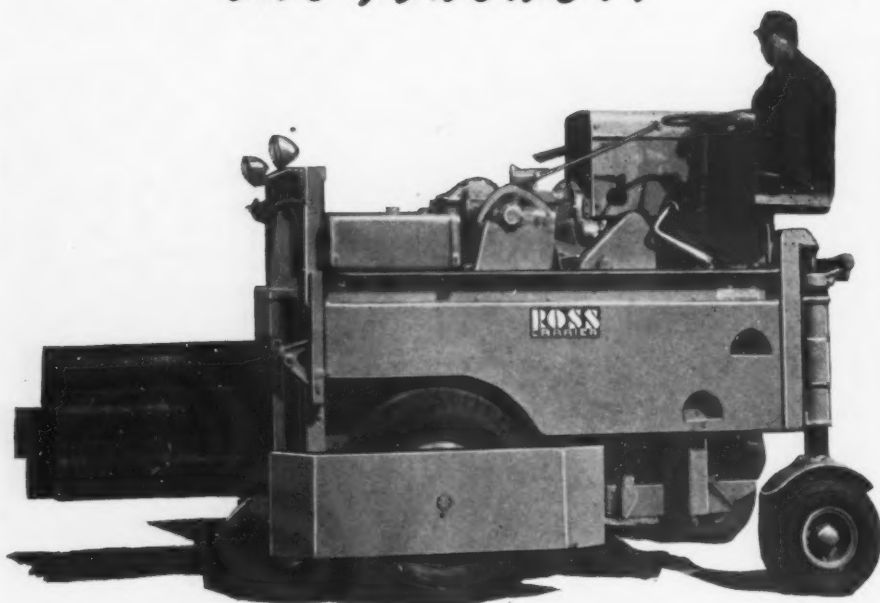
THERE'S a new flag flying over our plant—our distinguished service medal—the Army-Navy "E" Award for excellence in war production.

Quietly, traditionally, KELEKET performs the job assigned—and in the performance makes a "major contribution to victory."

THE KELLEY-KOETT MFG. CO.
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PIONEER CREATORS OF QUALITY X-RAY EQUIPMENT SINCE 1900

the Answer:



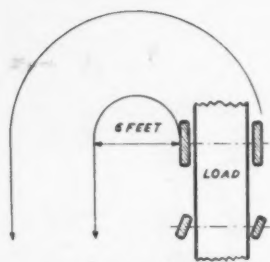
HIGH-SPEED HANDLING of LONG--HEAVY--BULKY LOADS

To many industrial plants the Ross Carrier brings a new conception of rapid transportation of heavy, bulky materials, indoors and out—in and between plants and plant departments—from warehouse and loading dock to production line.

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Here's speed and economy in handling unit-loads up to $4\frac{1}{2}$ tons. Rugged, smooth plated frame protects the load, as well as materials stacked along runways. Low overall clearance is provided by special mounting of heavy duty 50 HP gasoline motor. Driver's seat located to permit clear visibility in all directions.

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Six-foot inside turning radius possible with a full load. Differential-type steering permits fast, efficient maneuvering in congested areas.

THE ROSS CARRIER COMPANY, BENTON HARBOR, MICHIGAN



16% of March Steel Reported Alloy Grade

Washington

• • • In a letter to alloy steel producers last week, WPB Steel Division Director H. G. Batcheller said that 16 per cent of all steels produced in March was of the alloy grade, about three times the peacetime average, but that despite this increased production, large war demands necessitate strict conservation of alloying elements. For the calendar year 1942, alloy steel production amounted to 13.1 per cent of all steel produced.

After examining all proposed melting schedules for next month, the Steel Division has suggested the use of NE alloy steels in many instances, and has asked producers to notify it if they are unable to comply with specific suggestions made in each case.

Metals Branch, OPA, as well as other Army and Navy representatives.

George Wright of National Bronze & Aluminum Foundry Co., Cleveland, is chairman of the aluminum foundry branch of the association, and A. J. Peterson, Advance Aluminum Casting Corp., Chicago, is vice-chairman. E. G. Fahlman, Permold Co., Medina, Ohio, was chairman of the arrangements committee.

New Timken Plant Among Recently Approved Contracts

Washington

• • • Defense Plant Corp., RFC subsidiary, has authorized the following contracts:

Koppers Co., Baltimore, to provide additional equipment for a plant in Maryland at a cost in excess of \$25,000, making a total commitment of more than \$4,900,000.

General Motors Corp., Detroit, to provide additional equipment for a plant in New Jersey at a cost in excess of \$800,000, making a total commitment of more than \$3,750,000.

The Timken Roller Bearing Co., Dayton, Ohio, to provide plant facilities in Ohio at a cost in excess of \$1,750,000.

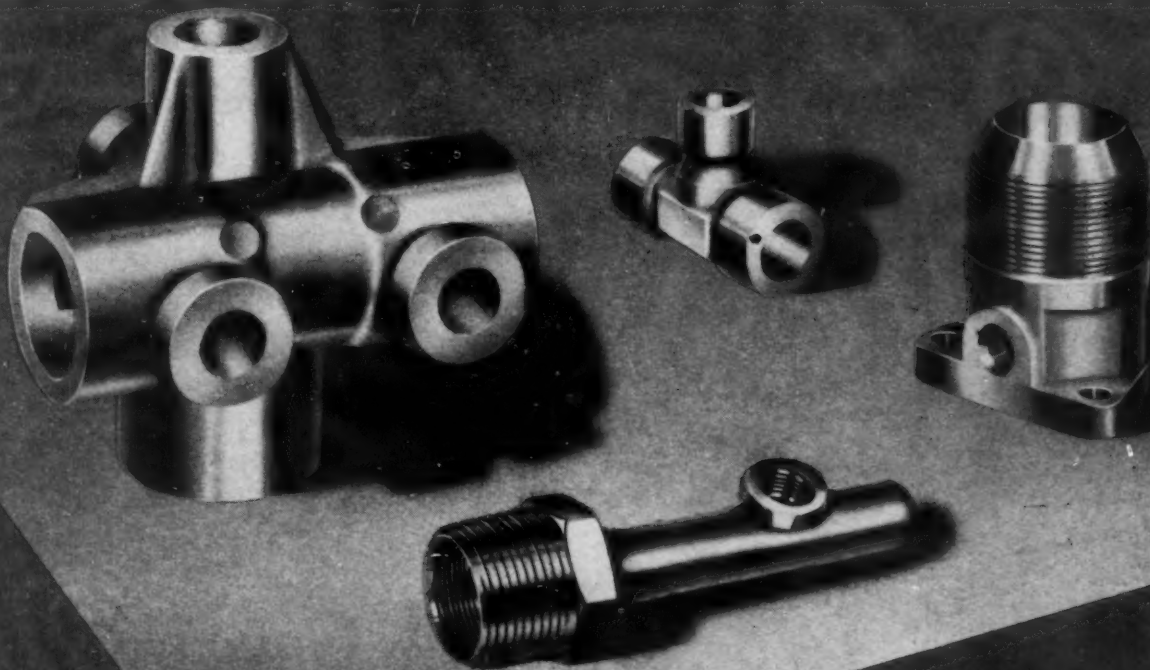
National Lead Co., New York, to provide plant facilities in New York at a cost in excess of \$1,500,000.

Ahlberg Bearing Co., Chicago, to provide plant facilities in Illinois at a cost in excess of \$1,000,000.

The Babcock & Wilcox Tube Co., Beaver Falls, Pa., to provide equipment for a plant in Pennsylvania at a cost in excess of \$425,000.

Trayer Products, Inc., Elmira, N. Y., to provide additional equipment for a plant in New York at a cost in excess of \$100,000, making a total commitment of more than \$130,000.

General Electric Co., Schenectady, N. Y., to provide additional plant facilities for a plant in Ohio at a cost in excess of \$22,000, making a total commitment of more than \$120,000.



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Our modern foundry can be placed at your service immediately for the manufacture of brass or other copper base alloy sand castings.

Ample capacity and the latest equipment **PLUS** experienced men who have the "know how" for the production of close tolerance work will assure you of uniform high quality castings with close grain structure.

We can furnish castings rough, machined, polished or plated. Our own Tool Room and Pattern Shop are ready to turn out any necessary tools or patterns if your job is in the blueprint stage. We manufacture a standard line of valve bodies of all kinds —STREAMLINE pipe fittings for heating, air conditioning, water works, plumbing and refrigeration use —OR TO YOUR OWN SPECIFICATIONS.

If you need castings in a hurry — WRITE US NOW.

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BRASS CO.
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**. . . AND SPOIL THE CHILD
IS AN OLD AXIOM**

**Sell a Customer a Tool Welding Rod Without Proper
Engineering and Supervision and You Spoil the Job**

There is only one SUTTONIZING welding process for the reclamation of hi-speed steel cutting tools. Imitators who attempt to follow in the footsteps of the long tried and true SUTTONIZING practice, find the going extremely tough.

Let us elaborate: First of all, any material sold for hi-speed tool repair in your shop is usually doomed to failure, principally because the user cannot pass through the rigorous experimental stages that the Welding Equipment & Supply Company have. The Welding Equipment & Supply Company are *positively* the indisputable *originators* of this process. Then too, the lamentable fact remains that the seller of any rods purporting to work as well as SUTTONIZING must fail because that vendor would not have the engineering talent at hand to properly institute this work in any welding department.

As a matter of fact, we have tried and miserably failed in most instances to achieve satisfactory results except *in our own plant* under the keen and painstaking scrutiny of our engineers, using only skilled operators, well seasoned in this delicate welding process.

For complete details on SUTTONIZING write or wire us today.

WELDING EQUIPMENT & SUPPLY CO.
230 LEIB ST. DETROIT, MICH.

1942 Steel Earnings Yield 5.6% Returns

• • • Net earnings of the steel industry in 1942, the greatest year for steel production ever recorded, represented a return of only 5.6 per cent on investment, according to the American Iron & Steel Institute. Seventy-five companies accounting for more than 90 per cent of total production showed aggregate net income of \$221,230,000.

Because of a 32 per cent increase in the industry's taxes between 1941 and 1942 and a 30 per cent payroll rise, total steel earnings dropped one-third below the \$326,090,000 earned in 1941 when the companies earned 8.1 per cent on their investment. Total steel sales are estimated at \$6,275,000,000—a new peak 19 per cent above the previous 1941 record. Profits per dollar of sales were 3.5 c., against 6.2 c. per dollar in 1941. Taxes totaled \$776,104,000.

Total 1942 payrolls of \$2,176,051,000 exceeded the previous peak of \$1,673,234,000 in 1941. Dividends of \$152,716,000 to stockholders, were less than in 1941.

N. Y. Procurement Office Opened to Aid War Plants

• • • To expedite Quartermaster Corps procurement and provide on-the-spot service for manufacturers, especially small war plants, in the Middle and North Atlantic states, the New York City Procurement Office was opened April 22, consolidating small procurement offices previously maintained in New York by various Quartermaster Corps depots.

Items and specifications of articles manufactured generally throughout the area are displayed in an extensive sample room.

Eastman Analyzes Use of Inland Waterways

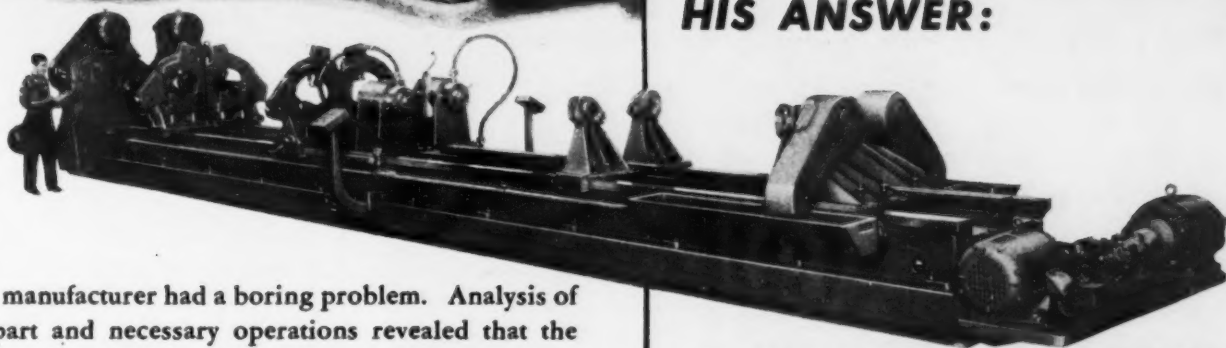
Washington

• • • Discussing the marked increase in use of inland waterways, Joseph B. Eastman, ODT director, said last week that a heavier volume of such commodities as coal and steel on the Mississippi and Ohio rivers, particularly structural steel, combined with the withdrawal of 116 barges for conversion to petroleum carriage, has brought into use virtually all open top barges. He pointed out that movement on these rivers remains unbalanced.

**BUT WHERE CAN WE
GET A MACHINE
THAT BIG?**



HIS ANSWER:



This manufacturer had a boring problem. Analysis of the part and necessary operations revealed that the final machine would require a floor area of 371 square feet. Thus, another factor entered into the selection of a machine designer and manufacturer to handle the job... manufacturing and assembly capacity.

To machine the long, heavy beds and other component parts of equipment of this size calls for machines of equally large capacity. In addition, assembly space must be ample for erecting and testing the equipment before shipment. You'll find both at W. F. and John Barnes.

Whether your problem involves low or high production, in drilling, boring, milling, tapping and honing operations, our engineers will be pleased to work with you. There is no obligation.

HOW TO GET A MACHINE TO FIT YOUR JOB!



Write for this set of eight bulletins describing the Barnes method of obtaining better machines. Each bulletin traces a machining problem from the original study of the part to the final machine design. Ask for bulletins S-31 through S-38.



A W. F. AND JOHN BARNES 16-FOOT STROKE DRILLING AND BORING MACHINE

This 83,000 lb. machine was completely assembled and tested on our new assembly floor before shipping. It was designed for drilling or boring large cylindrical work and machines two parts simultaneously. It occupies 371 square feet of floor space, and is built in two sections.

This is an excellent example of the wide range of engineering and manufacturing facilities available from the W. F. and John Barnes Company.

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This small machine, designed and built to face two bosses in a small cast-iron housing, is another example of a machine designed for a specific job.



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**ESPECIALLY DESIGNED
 FOR EACH JOB...**

PRECISION

3 ODD ONES — To you they are just 3 ordinary bolts—to us they are 3 problems solved for 3 products and 3 customers. In fact no other bolt or stud is exactly like any one of these, yet all 3 have something in common with everything made for the war effort—that is the urgency of their need. We, at Erie Bolt & Nut, are geared to produce bolting to specifications on a 24-hour a day basis with Uncle Sam determining the urgency.

ERIE BOLT & NUT CO
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Crucible's Renegotiation Offer Is Rejected by Navy

• • • Although the Navy Price Adjustment Board has rejected the voluntary offer of \$13,500,000 made by Crucible Steel Co. in settlement of contracts up to Dec. 31, 1942, under the renegotiation law and has decided that the company should pay \$17,700,000, F. B. Hufnagel, company chairman, told stockholders at the annual meeting April 21 at Jersey City, that the \$4,200,000 increase over the original offer "will be liquidated mainly with funds which otherwise would be payable as income and excess profits taxes."

"The remainder will be charged against the reserve provided for contingencies, so that net income for the year as indicated in the annual report will be unaffected by this action. The net amount to be charged against the contingent reserve will be \$1,211,891, reducing this reserve, which at Dec. 31, 1942, was \$4,380,395, to \$3,168,504," Mr. Hufnagel said.

There is reasonable expectation that the company will realize and be allowed to retain a fair profit from operations during 1943, Mr. Hufnagel said, although disbursements of common stock dividends cannot be authorized until the result of the year's business can be appraised. He remarked that the renegotiation proceedings have been carried on throughout in a spirit of cooperation.

WMC Expands Plans for Employment Stabilization

Washington

• • • Recognizing it as a serious war production problem, WMC is preparing for a broad and rapid expansion of its employment stabilization plans in an effort to reduce absenteeism to a minimum. Under the program the existing 67 stabilization plans in as many industrial areas will be increased to perhaps 150 or more.

Like the stabilization plans now in operation, the problem of absenteeism would be attacked by local committees of management and labor.

Mills Stop Scrap Shipments

Philadelphia

• • • Lacking space to unload cars, several mills in this area have suspended shipments of all scrap. Overloading is probably due to industrial scrap and machine shop turnings rather than dealer scrap.

INTERNATIONAL MACHINE TOOL
INDIANAPOLIS, IND.

LIBBY



OPERATIONS

MACHINE—Libby 1-H Heavy Duty Turret Lathe.
PART—Shell End Mill Body.

MATERIAL—3135 Alloy Steel Forging.

HOLDING METHOD—Chucking in 3 Jaw Scroll Chuck.

MACHINING SEQUENCE

FIRST SIDE

- 1—Rough turn $7\frac{1}{2}$ " O.D.—Rough face with cross slide, removing $\frac{1}{2}$ " stock on O.D.
- 2—Drill— $1\frac{1}{16}$ " hole.
- 3—Ream.
- 4—Radius on corner of body and chamfer in hole.

SECOND SIDE

- 1—Turn O.D.
- 2—Face 2d side.
- 3—Counterbore 10° angle.
- 4—Chamfer corner—burr edge of bore.



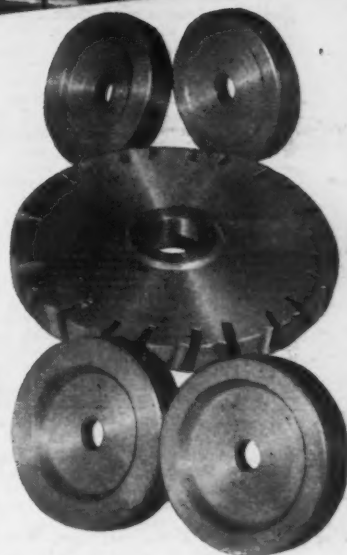
FREE Write for catalog covering the extensive line of Libby Type H Heavy Duty Turret Lathes. Ask Libby engineers to make specific recommendations. Write to Libby Division, 1136 West 21st St., Indianapolis, Ind.

CUTS OF $\frac{1}{2}$ " IN TOUGH ALLOY
STEEL ARE COMMON WITH

LIBBY

HEAVY DUTY TURRET LATHES

A prominent cutting tool manufacturer uses a Libby 1-H Heavy Duty Turret Lathe for turning rough alloy steel forgings used as inserted blade cutter housings. Four operations are performed on each of the two sides of the cutter bodies which vary in size up to 16" in diameter. Quantities vary from 1 to 25 with about 6 to 8 of each type. Floor-to-floor time is 45 minutes on the $7\frac{1}{2}$ " diameter cutter.



FOR ACCURATE TURNING OF HEAVY DUTY WORK

Libby Heavy Duty Turret Lathes have been designed to perform heavy work while holding close tolerances. The micrometer feed dials, reading in thousandths, save time in holding close dimensions, both in longitudinal and cross feeding.

This installation is typical of the way Libby Heavy Duty Turret Lathes are being used for heavy duty turning as well as the regular run of turret lathe work.

If your turret lathe work is large or unwieldy, consult our engineers for their recommendations. Your work may require a fixed or sliding bed gap turret lathe to accommodate irregular shaped parts. It may require a conventional turret lathe with extra rigidity to handle heavy cuts. It may require a machine of sufficient stamina to handle occasional large pieces and other miscellaneous jobs. Whatever your turret lathe requirements, our complete line of heavy duty machines undoubtedly includes the size best suited to your work. Consult Libby engineers—there is no obligation.

INTERNATIONAL MACHINE TOOL CORPORATION

LIBBY DIVISION, INDIANAPOLIS, INDIANA

FOSTER DIVISION, ELKHART, INDIANA

MAIN OFFICE AT ELKHART, INDIANA

FOSTER FASTERMATICS • LIBBY HEAVY DUTY TURRET LATHES • STANDARD TOOLS
SUPERFINISHING MACHINES • DARKER CHUCKS • UNIVERSAL RAM TYPE TURRET LATHES

Era of Unprecedented Prosperity Predicted for U. S. in New Report

Washington

• • • With the job left primarily to private enterprise, aided and supported by government, the Department of Commerce has just released a 43-page volume, with charts and tables, that in broad strokes paints

a potential postwar Utopia. The big problem, it was pointed out, is to prepare now to so manage major potentials as to translate them into realities. Once that is done, an era of unparalleled peacetime prosperity for the United States is seen. These fac-

tors include employment on an unprecedentedly high level, the greatest productive plant of all time, national income at a peak "hardly dreamed of in prewar years," with a large volume of accumulated savings, and an unmeasured demand for goods denied to the consumer by war's exactions.

Included in the volume is an appraisal of postwar possibilities for the steel industry. The analysis was made by John T. Anderson of the market research department of the American Rolling Mill Co. The analysis is in the nature of a mathematical calculation on which it is proposed to base finished estimates, rather than a forecast of what lies ahead for the American steel industry after the war.

"Markets After the War" was prepared by the Bureau of Foreign and Domestic Commerce under the direction of S. Morris Livingston, chief of its national economics unit, at the suggestion of the Committee for Economic Development. The committee consists of outstanding business men and is headed by Paul G. Hoffman, president of the Studebaker Corp. The publication makes no pretense at affording a refined projection of postwar activities because it was possible only to base calculations on past relationships in order to develop vast potentials.

"The war is demonstrating the vast productive capacity of this country when the demand exists," the report says. "The national output has reached a level which few people believed possible three years ago. Stimulated by war demands, a decade of technological development has been crowded into a few months."

Discussing the capacity of available manpower after the war, the report says that allowing for a continuation of the past trend toward greater increased output per worker, the nation's total output could be 40 to 50 per cent more by 1946 than it was in 1940. The dollar volume in 1946, would, of course, depend upon prices prevailing at that time, the report explains.

An analysis of the capital goods market leads to the conclusion that the enormous war plant expansion does not preclude the possibility of a satisfactory volume of business after the war. At the same time, it was pointed out that unless business enterprise can overcome the economic maladjustments left by the war, certain industries and communities may have a large volume of unemployment while other industries and com-

OUTLINE OF STEPS IN ANALYSIS OF POSTWAR MARKETS FOR THE AMERICAN ROLLING MILL CO. BY JOHN T. ANDERSON, MARKET RESEARCH DEPARTMENT, EXTRACTED FROM "MARKETS AFTER THE WAR"

• • • Our first step was the utilization of simple methods of graphic analysis. Scatter diagrams were prepared to illustrate the nature of the correlation between production of steel ingots and the following measures of economic activity: gross national product, net national income, supernumerary income, disposable income of individuals, and the Federal Reserve Board Index of Production. In all cases, dollar figures were adjusted to the price level prevailing in 1940. The last year of so-called normal peacetime business. We have found it necessary, in some cases, to translate our work into the higher price levels of later years.

These diagrams for steel ingots showed, in varying degrees, a definite correlation with the various concepts of income, production, etc. In several cases the relationship was considered close enough to warrant projection to the higher levels of income expected after the war. We were aware of the danger of considering such projections as unqualified estimates. They were merely the first approximations to be further tempered by more detailed analysis.

A regression equation derived by the "least squares" method was used to project the tonnage of steel ingots which might accompany high levels of income. Where the graphic analysis showed the need for it, a third variable—time, was added. When an equation had been completed, the actual data and the estimates were plotted on a time chart. The standard error of estimate was also calculated.

These projected tonnages of steel ingots seemed quite high, especially in view of the present war relationship between national income and ingot production. However, a closer examination of some of the abnormalities existing in the present situation helped to account, in some measure, for the apparent unbalanced relationship. The war requirements for steel relative to a high level of total industrial production and national income are less than the peacetime requirements for steel relative to an equally high volume of business. This is true because raw steel is typically a smaller part of the total cost of finished war goods than of the civilian goods which they have displaced.

Since our company is primarily a producer of sheet steel, this phase of the industry next drew our attention. The same basic types of analysis were made with sheet steel as were made with ingots. And, as was also true with ingots, the production of steel sheets showed the best correlation with the concept of net national income. The scatter diagram for these two variables gave evidence of a decided upward time trend in the production of sheets. Hence, an equation was worked out with time as the third variable.

But when the resulting estimates were plotted against the actual data, we found distinct over-estimation in the early years and a tendency to under-estimate actual experience in the later years. This brought up the advisability of eliminating a few of the earlier years in the construction of the most logical equation. This did not seem too unreasonable since the continuous process of rolling sheets was being developed in those years and causing somewhat of a mild revolution in the production of sheet steel.

By following through with this, we developed an equation which gave a much closer fit to the actual data. The next step was to calculate the tonnage of steel sheets which would be related to high levels of income, and to compare this with actual sheet capacity. Our company's part in this picture was also determined.

Basically, our idea in all this mathematical calculation, was to establish the most logical type of correlation, use the projections as first approximations of future volume, and refine the preliminary estimates by a closer study of all the varied forces which would affect the future consumption of sheet steel. This involved an examination of such factors as:

1. Speed of reconversion in metal-consuming industries.
2. Effects of probable backlog of demand in durable goods.
3. Effect of competing materials, both short and long-term aspects.
4. Probable depleted state of steel inventories at the close of war, and need to build them up again.
5. The export situation.

These and many others are being studied so that our finished estimates will be based on more than mathematical formulae. Then, too, we must allow for the fact that even our first step, the graphic analysis of past correlation and its projection into higher income levels, is based on the assumption that past relationships and trends will continue to progress in the same general directions and at the same relative rate of speed. In some cases this will be a rather questionable assumption due to the rapid economic changes brought about by war.

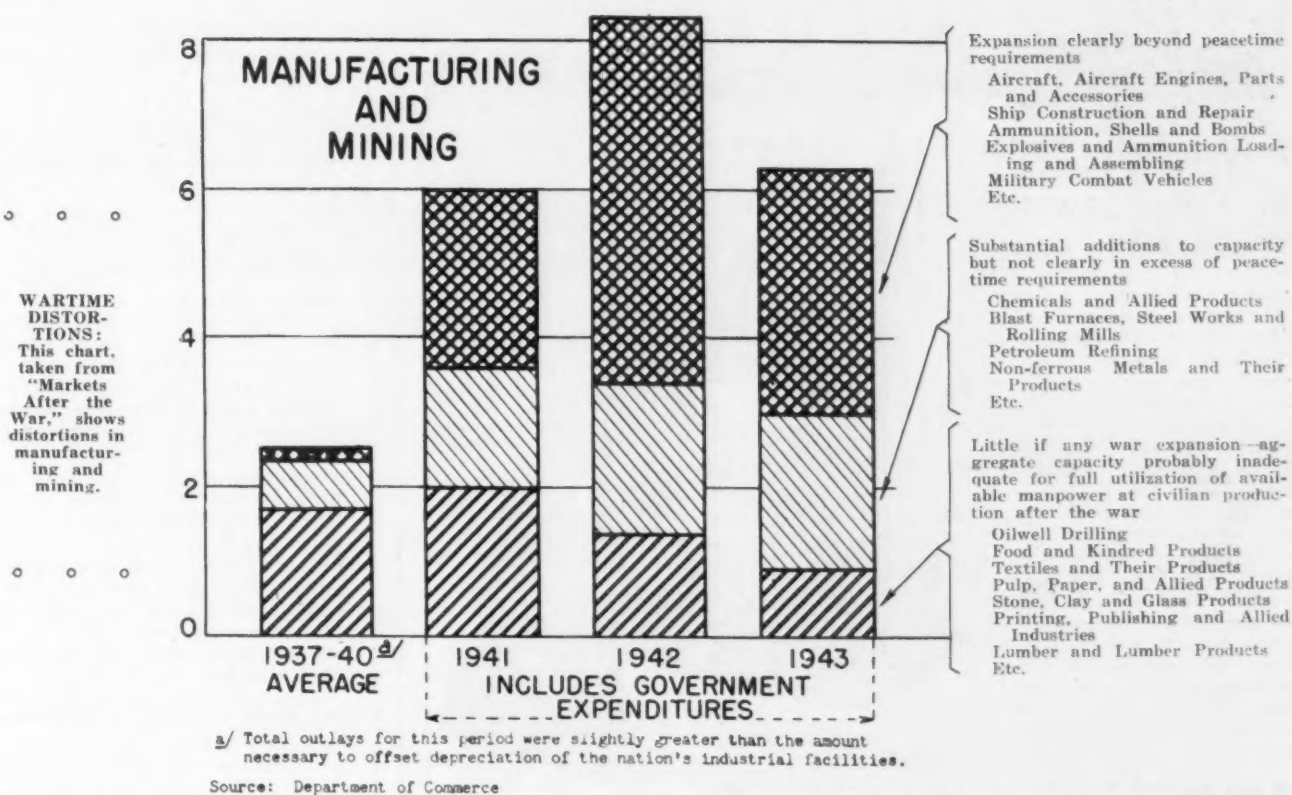
Nevertheless, this graphic approach seems to be the most logical first step. This is especially true since these analyses will be found useful for more than projection purposes. Careful study of graphs will reveal important cause and effect relationships never before recognized and will open up new fields of investigation.

To return to our analysis of the postwar market for steel sheets, once we have crystallized some workable estimates for various income levels we start other angles of investigation. Attempts are being made to estimate the probable markets for finished durable goods products and finally the probable markets for individual types of steel sheets.

This is a long and painstaking task, but it is felt to be necessary for at least two reasons:

1. It affords a check on the validity of our previous estimates.
2. It enables us to better understand the end markets for our basis sheet products.

By following through on the basis of steps outlined above, we believe we can arrive at some estimates that will be fairly reliable for the immediate postwar years. These estimates will help to foster plans that should contribute to the realization of high levels of employment and income which are so fundamental to our postwar world.



munities have a demand for more than they can produce.

The extent of the accumulated purchasing power at the end of the war will depend on the length of the war and on Federal fiscal policies which have not yet been determined, the report says. It added that if the war should last through 1944, the total savings for three years might exceed \$100,000,000,000 as against a normal tendency to save no more than half that amount.

"Since the production of goods and services after the war will in large part create its own market, this accumulation of purchasing power should be more than ample to assure an aggregate demand for all goods the available manpower can produce," it is declared. In fact it suggests that the problem after the war may be to control a boom rather than prevent a depression.

"This assumes reasonably effective control over prices during the war."

It is pointed out that prewar facilities were inadequate for the productive employment of the then available manpower, to say nothing of the further growth of the labor force. The present total output of goods and services, which was said to be approximately equal to the estimated capacity of available manpower after the war, was declared to be possible only because of the enormous outlays for new plant and equipment in war industries in the last two years. Aside

from the difficulty of converting many war plants to civilian use, it is pointed out, there are other reasons why this expansion will not be adequate to turn out the same volume in civilian goods. In general, the report says, the physical plant of the country has been operated at considerably more than the optimum rate which would prevail if business were free to reduce costs by adding to capacity. The report finds a number of potentially difficult situations for particular lines of business, one being the market for general purpose machine tools.

The report discusses in detail the enormous potential market for residential construction and said that inventories also will be important. Since the middle of 1942, it was declared, the value of business inventories, including goods in process for

government account, has been declining.

In the international sphere, says the report, there is general agreement among experts that the demand for goods will exceed the supply for several years after the war. Granting the difficult problem of how other countries are going to pay for American exports, this can be an important market, it was added.

In concluding a discussion of the reconversion program, the report explains that the extent that there is unemployment because of bottlenecks in physical plant, because the marketing, engineering and organization problems of conversion to peacetime output have not been solved, the purchasing power and the market created by full production will no longer exist.

"This," it is declared, "is a challenge to business ingenuity."

Steel Industry in Post War Era

Pittsburgh

••• Post war ideas, rather than specific post war plans, have been advocated by some executives in this steel center. It is being asked by some here, "how can definite plans be laid down covering conditions which as yet do not exist?" Without deterring the war effort, some steel executives are studying, through their proper depart-

ments, expected general post war trends.

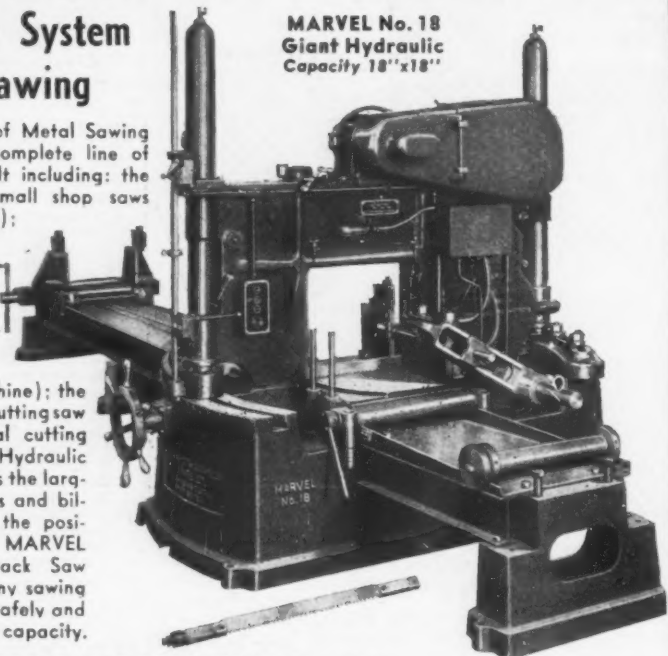
One outstanding development in the steel industry recently has been the complete washing out of overall customer relationships through the installation of the Controlled Materials Plan. No sales manager wants to talk too much about it at present, but relationships built up over a number of years have been superseded by gov-

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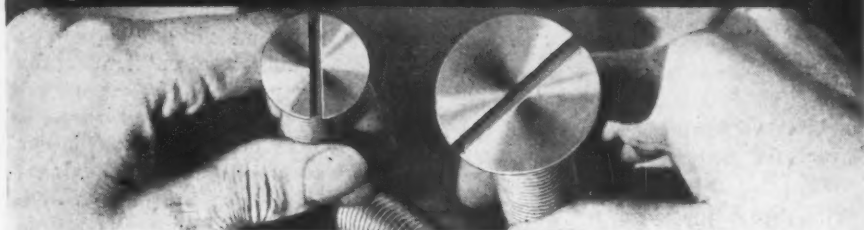
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NEWS OF INDUSTRY

Unknown Labor Act Stumps Pittsburgh

... Pittsburgh industrialists suddenly found out last week that the Pittsburgh area and the rest of the state has been technically under an "Employment Stabilization Plan" since January 18.

Confusion mounted rapidly when the U. S. Employment Service announced that the critical classification was still informal and would not be "formal" until a committee was named, probably some time after May 1. This immediately brought up the question as to what real status the city and state had if no formal directive has yet been issued. Industrialists were told to conduct themselves as if the stabilization plan were effective, but USES officials have admitted that the plan was not "legal" as yet.

This situation has led some observers to believe that the voluntary move towards the 48-hr. week has not been progressing rapidly enough and that the area may soon find itself under a mandatory 48-hr. week order.

ernment directives which in the last analysis mean, first come first served.

Steel companies today under CMP are obligated to fill orders from any customer as long as this business can be rolled on operating schedules. The result has been that every steel company has a substantial number of new faces on its order books. Consumers who previously may have purchased as little as 1000 tons a year from one company, may now due to CMP have several times this volume on this company's order books. On the other hand, there has been a wholesale reshuffling of customers from one company to another, which has been dictated by availability of material and the speed with which allotment numbers have been obtained.

It is advocated by some steel people that what is left of the sales department should concentrate more on the study of possible post war trends. This has been done by some companies. Some steel concerns because of the draft, enlistments, dismissals, or normal changes in turnover, have only a fraction of the men on their sales force which they had before Pearl Harbor.

This situation not only applies to strictly sales personnel, but to sales research, market analysis, metallurgical forces, etc.

The steel industry is not too per-

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Off the Cutter and Work*

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Qualities of a Milling Machine . . . Convenience and Flexibility of a Horizontal Boring Mill.

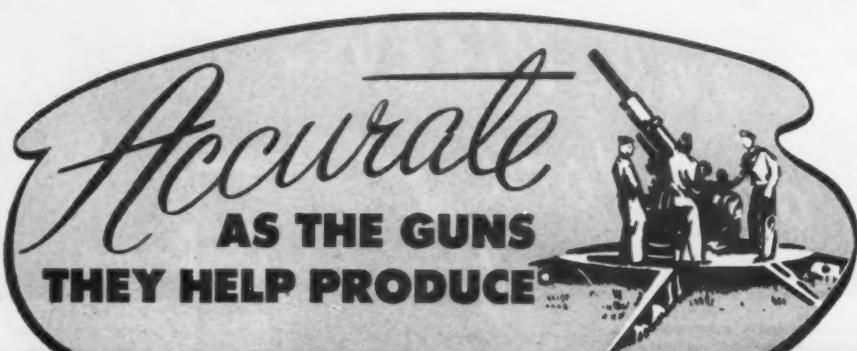
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Many machines show 75% greater average daily productivity.

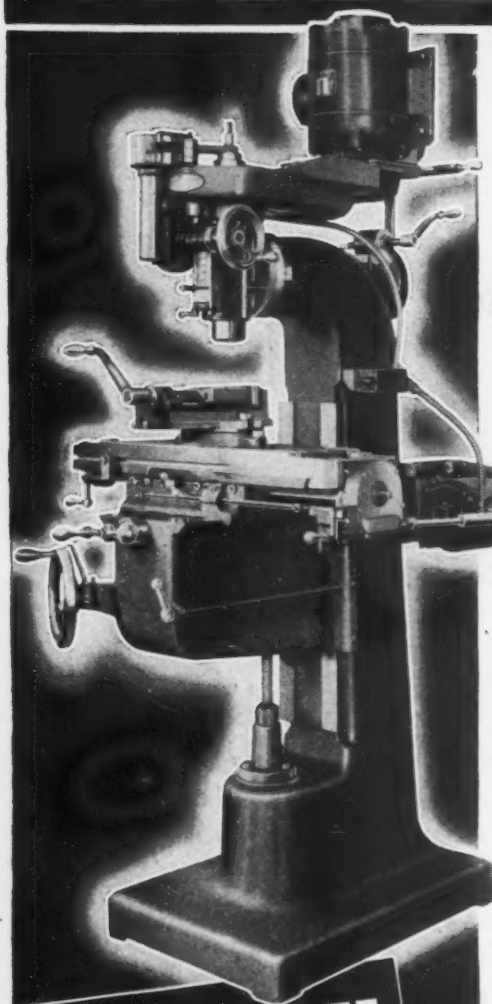


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INDEX MILLS



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CHECK THESE FEATURES!

- ★ Precision Ball Bearing Spindle that will require no attention for two years.
- ★ Swivel Head which can be set 90° right or left.
- ★ Super construction sensitive enough to do work with end mills $\frac{1}{8}$ " diameter yet rugged enough to use $\frac{3}{4}$ " end mills taking full cuts 24 hours a day.
- ★ Verniers for locating, and power feed to spindle for boring.
- ★ A versatile machine that can be used in the tool room or on the production line.

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Charcoal Iron Users Must Justify Needs

• • • The shortage of charcoal (see *THE IRON AGE* April 22, page 110) has become so serious that some users recently have been asked to justify their use of charcoal pig iron. Major consumers are malleable foundries, roll foundries and abrasion resisting cast iron producers. There are many other types of consumers, but some of them are quite marginal. It wasn't so long ago that the Navy, needing ballast for certain ships, bought expensive charcoal iron for the purpose.

turbed now regarding its post war position with the automobile industry. It is said that for several months after the war motor car manufacture will follow the same general lines as it did previous to the conversion of the industry. During that period the steel industry will probably have time to study conditions tending towards more radical departure in materials and design of the automobile of the future.

Post war ideas, some authorities here say, should remain no more than ideas at the present time. This does not mean, they claim, that new products and methods which have materialized because of the war should be completely ignored. To be specific, one steel industrialist says, "We do not particularly know nor can we find out at the present time what operations will be after the war, what volume of business the strip mills will obtain, whether open hearth alloy steels will be in a death grip with electric steels, whether both of these will be devitalized by a greater use of carbon steels, or whether the complete rehabilitation of the world will absorb the steel industry's capacity for some time to come. All we can have are ideas on these subjects.

Many things the steel industry and other industries here are now certain will occur after the war, include a terrific competition between metals which can perform the same function economically, a definite assurance within the steel industry that price competition will be keener than ever, a greater realization that flexibility and lower investment per item of output will be a necessity, and the knowledge that many of the government controls now in effect may not be relaxed, if at all, for some time after the war.

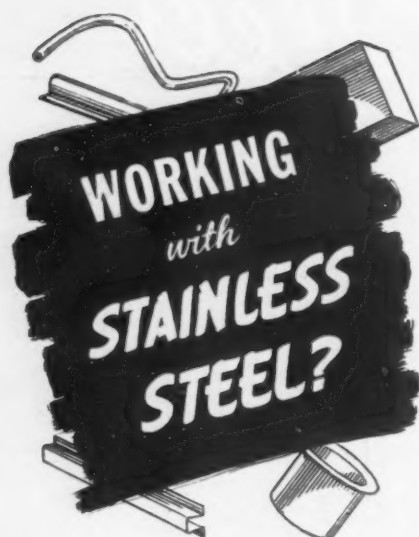
Five Ocean Fleet



Here is one step in the building of the "five ocean fleet." It shows the tapping of a heat for a steel made to U.S. Navy Department's rigid requirements. Today the entire output of "A.W." Quality Steels is allocated to war production. Whatever your steel problem may be, we will do everything possible to help you.

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MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

CMP—PRIORITIES

CMP Prohibits Shipments of Heat Treated Steels to Warehouses

Washington

• • • Steel producers have been prohibited, until further notice, from shipping normalized or heat-treated carbon or alloy steels on any commercial warehouse order, the CMP Division of WPB announced last Friday. However, if steel to fill such orders has already been normalized or heat-treated, or is now in process of being, it may be shipped when and as completed, if the orders are otherwise validated in accordance with WPB regulations.

Warehouses have placed orders for these particular types of steels to an extent which endangered deliveries for more important purposes. It has been reported that in some instances 25 per cent of the orders for these types now on mill books are from warehouses.

To take care of this condition, Direction 5 under CMP Regulation No. 1 has been issued to prevent deliveries to warehouses until further notice. The prohibition does not apply to shipments to warehouse stocks earmarked for aircraft use or for direct shipment to a manufacturer of aircraft or aircraft parts. It does, however, cover all other orders for ware-

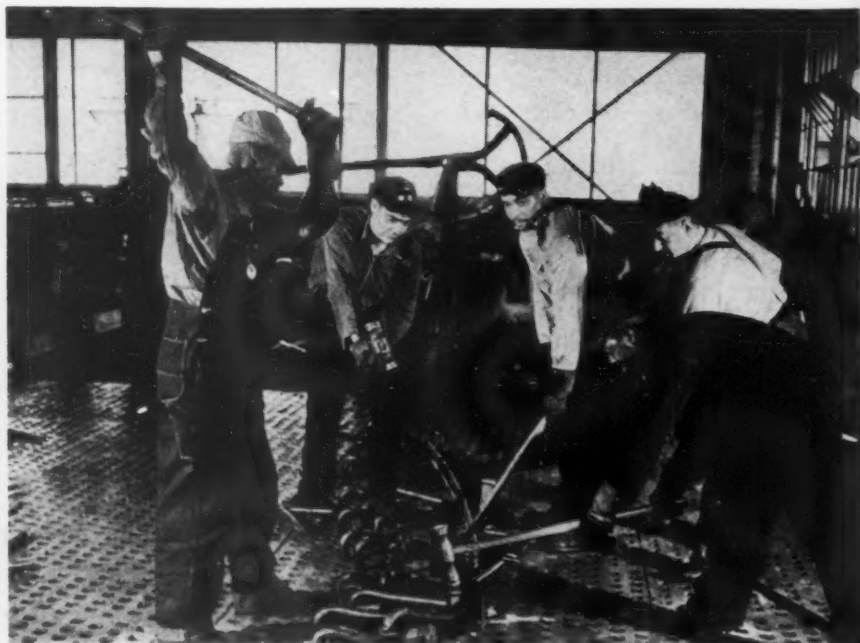
house stocks and deliveries to warehouse customers.

Commercial warehouse orders which have already been melted but which have not been placed in process of normalization or heat-treatment should be renegotiated with purchasers on the basis of furnishing plain hot rolled, annealed or cold drawn steel, according to the Direction. Commercial warehouse orders which have not as yet been melted be either cancelled or renegotiated with a view to substituting these types.

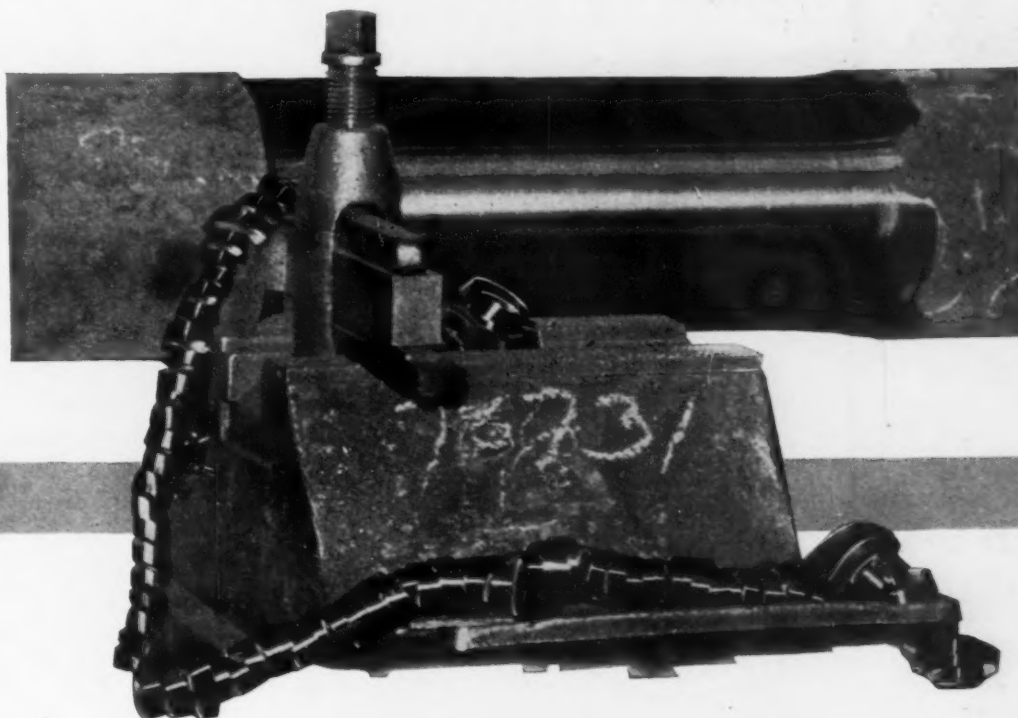
Revision of M-293 Alters Critical Component Schedule

• • • Revision of the schedule of critical common components whose manufacture and distribution are controlled by General Scheduling Order M-293 was announced by WPB. Principal changes eliminate all hand tools and add Parker type valves, gasoline carburetors, marine fittings hardware, electric motors and generators and oxygen equipment to the components controlled by the scheduling order. There are also a number of changes in product designations, and changes in the forms which must be filed.

SKILL, SERVED HOT: They've got rhythm, these Negro workers of U. S. Steel's Federal shipyard. Ship plates, white hot, must be shaped to fit different parts of a hull. They are fastened against wedges by mauling down those gigantic pins. A powerful hydraulic shaper bends the livid steel. The crew, wielding 20-lb. hammers, follows the bend and pins the plate tight.



Employ KENNAMETAL* Carbide Tools IF LOSS OF SIZE IS RETARDING YOUR PRODUCTION

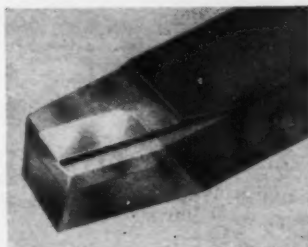


Rejections or re-working of machined steel parts represent a loss of man hours—a loss that prevents economical production and retards the war effort. When ordinary carbide tools are used on long cuts, a large percentage of these rejections results from excessive taper caused by tool wear.

This tool wear is often caused by insufficient clearance angles, which have been used in order to provide support for a weak cutting edge. KENNAMETAL'S high tensile strength permits clearance angles large enough

to prevent excessive tool wear and yet afford proper support to the cutting edges.

KENNAMETAL'S ability to "hold size" aids in eliminating loss of size on steel cutting operations.



If taper caused by tool wear is preventing maximum, economical production in your shop—use KENNAMETAL steel-cutting carbide tools for all boring, turning, and facing operations. Catalog on request.

*INVENTED AND MANUFACTURED IN U. S. A.



McKENNA METALS Co.

144 LLOYD AVE., LATROBE, PA.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
Exclusive of Canada and Great Britain





FAST DELIVERY

on these **TURNER** gauges

✓ RING ✓ FLUSH PIN
✓ SNAP ✓ BUILD UP



EACH TURNER GAUGE BEARS THEIR STAMP OF PRECISION

Again Turner scores a first on the production front—with this announcement on fast delivery of their precision built gauges. These Ring, Snap, Flush Pin and Build Up gauges all bear the Turner Stamp of Precision—your guarantee that they have been carefully inspected and approved according to Turner's high standard of gauge making.

Our new plant is the reason why we can still maintain the highest standards, while increasing our production. It houses the most modern equipment available, and the most experienced men to run it.

Let us fill that rush gauge order. Wire or write us today.



Wire or Write Your Order Today!

TURNER GAUGE GRINDING COMPANY
2629 HILTON ROAD • • • • • FERNDAL, MICH.



IF YOU WANT GAUGES IN A HURRY MAIL THIS TODAY

Turner Gauge Grinding Co.
Ferndale, Michigan

Gentlemen:

Please rush complete information on your ring, flush pin and snap gauges today!

Name _____ Title _____
Address _____
City _____ State _____

CMP—PRIORITIES

New Restraint Placed On Electric Furnaces And Foundry Equipment

Washington

• • • Controls on production and sale of foundry equipment and electric metal melting furnaces were established in General Preference Order E-11, issued last Friday by WPB. The new order covers foundry equipment of the types specified in Schedule A attached to the order and having a retail sales price of \$200 or over and electric metal melting furnaces as defined in the order.

It provides that from and after June 1, no person shall sell, transfer or deliver any foundry equipment or electric metal melting furnaces except on orders bearing a preference rating of AA-4 or higher; nor shall such equipment be purchased by the application of any preference rating on Forms PD-25a, 25f, or CMP Regulation No. 5 or 5a.

Producers, when specifically required to do so by WPB, must file their proposed schedules of production and deliveries prepared in accordance with Priorities Regulation No. 1 and other applicable regulations. When the schedule is filed, WPB will issue a direction freezing it as submitted or with such changes as are found to be necessary.

All producers of foundry equipment and electric metal melting furnaces are affected by the order. It does not, however, prevent the sale and delivery of any part manufactured for use in the repair or maintenance of such equipment.

2.6 to 1 Ratio Established For Ferrochrome Producers

Washington

• • • To conserve high-grade chromium ores, producers of ferrochromium have been instructed to use a specific proportion of low-grade ores in a direction issued by WPB pursuant to Order M-18-a. This move requires each producer of ferrochromium to use, in the production of high-carbon ferrochromium, chrome ores having a weighted chromium-to-iron ratio not exceeding 2.6 to 1.

In a broad way, this means that each manufacturer will blend about one ton of low-grade chemical ore with about four tons of high-grade ore in order to obtain this ratio of chromium to iron. On the other hand, the ratio may also be obtained by using natural ores having a ratio of less than 2.6 to 1. A higher ratio may be used for a portion of production if the average consumption of chromium monthly does not exceed the 2.6-to-1 basis.

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AJAX INTEGRAL SOLID STEEL BED FRAME

provides unyielding rigidity

...THE FIRST ESSENTIAL OF PRECISION FORGING



● In every size Ajax Forging Machine, from the small 1 inch to the giant 8 inch, the bed frame is a *one-piece* steel casting designed for low unit stresses and maximum anvil-like rigidity. Liberal metal sections and compactness between the continuous crankshaft housings and the die seat minimize elongation from heading pressures, assuring uniform thickness and accurate lengthwise dimensions of large flanged forgings. Crosswise rigidity to prevent spreading of the gripper dies and formation of flash is provided by transverse C-ribs deep beneath the feed gap, and these are reinforced by overhead cross clamps on the 6, 7 and 8 inch Machines.

Consider this feature of unyielding bed frame rigidity, the basis of precision forging, in making your selection of forging equipment. Make Ajax features your measure of mechanical soundness in buying forging machinery.

Write for Bulletin No. 65-B.

BUY FORGING EQUIPMENT ON THE

BASIS OF MECHANICAL SOUNDNESS

THESE AJAX BED FRAME FEATURES ASSURE PRECISION FORGINGS

- ✓ Compact, rigid construction with minimum bed frame length between crankshaft and die seat minimizes stretch.
- ✓ Equally firm lengthwise support of stationary die by heavy side frame and of moving die by deep lengthwise C-rib reinforced by large overhead tie rod.
- ✓ Continuous crankshaft housings bridged by heavy crown rib, exclusive on Ajax Machines, with integral rear support for clutch shaft in accessible location.
- ✓ Heavy transverse ribs beneath feed gap provide crosswise rigidity and insure accurate die alignment for uniform high quality forgings free from flash.

THE

AJAX

MANUFACTURING COMPANY

Euclid Branch P. O. Cleveland, Ohio
621 Marquette Building • Chicago, Illinois

400 Plants Go Under Aircraft Unit

Washington

• • • Approximately 400 plants primarily engaged in aircraft production have been removed from the effect of Priorities Regulations 1 and 13 and placed under the control of the Aircraft Resources Control Office and the Aircraft Production by WPB Directive 16, issued last Saturday.

The directive placed in the hands of the Aircraft Scheduling Unit at Wright Field, Dayton, Ohio, authority to effect such transfers. Through the control office and production board, the Aircraft Scheduling Unit was given the duty of distribution of idle and excess inventories of controlled materials. This unit will issue regulations and prescribe forms which will

be necessary properly to carry out the program.

Among the inventory items involved are all primary forms and non-assembled, partially or wholly fabricated, forms of aluminum base alloys, copper and copper base alloys, and steel, including carbon, alloy, stainless and tool. In addition, the directive provides for the transfer of standard items of aircraft hardware and certain other assemblies and parts.

Tool Steel Ratio Relaxed

• • • To provide flexibility in the requirement that 75 per cent of high-speed steel orders be of molybdenum types, WPB amended Order M-21-h (tool steel) last Thursday. The amended M-21-h provides that orders and deliveries of high-speed steel to any person in any calendar quarter which balance within five per cent by weight, or within 500 lb. (whichever is smaller), of the required ratio is not a violation of the order.

In addition, those whose total receipts of high speed steel do not exceed 100 lb. per calendar quarter are exempted from complying with the 75 to 25 per cent ratio.

CMP Briefs

• • • Persons operating under CMP Regulation 5 are not permitted to use MRO symbols for making allotments to others. Interpretation No. 2 to CMP Regulation 5 (WPB 3283).

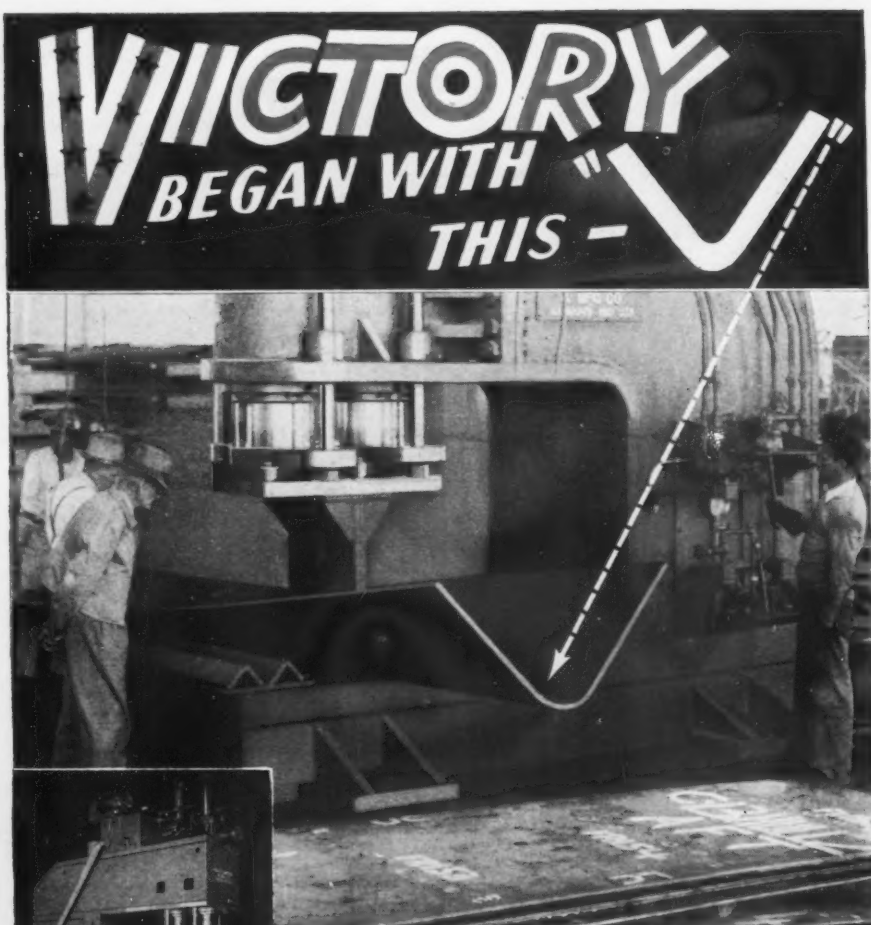
• • • Reels required for shipment or delivery of products may be obtained under CMP Regulation 5. Interpretation No. 3 to Regulation 5 (WPB 3308).

• • • Interpretations of CMP Regulation 5 also apply to CMP Regulation 5A. Interpretation No. 1, CMP Regulation No. 5A (WPB 3305).

• • • WPB announced on Monday that manufacturers of combat measuring instruments, as defined in Order L-203, will be required to schedule production of such items on the basis of preference ratings alone, without reference to allotment numbers. Directive 2, CMP Regulation No. 3.

Priorities Brief

• • • L-221 — The term "continental United States and Canada" means the 48 states, the District of Columbia and Canada for the purposes of General Conservation Order L-221, according to an interpretation issued on Monday by WPB. This exempts deliveries to Alaska, the Panama Canal Zone, Puerto Rico and other possessions and territories of the United States.

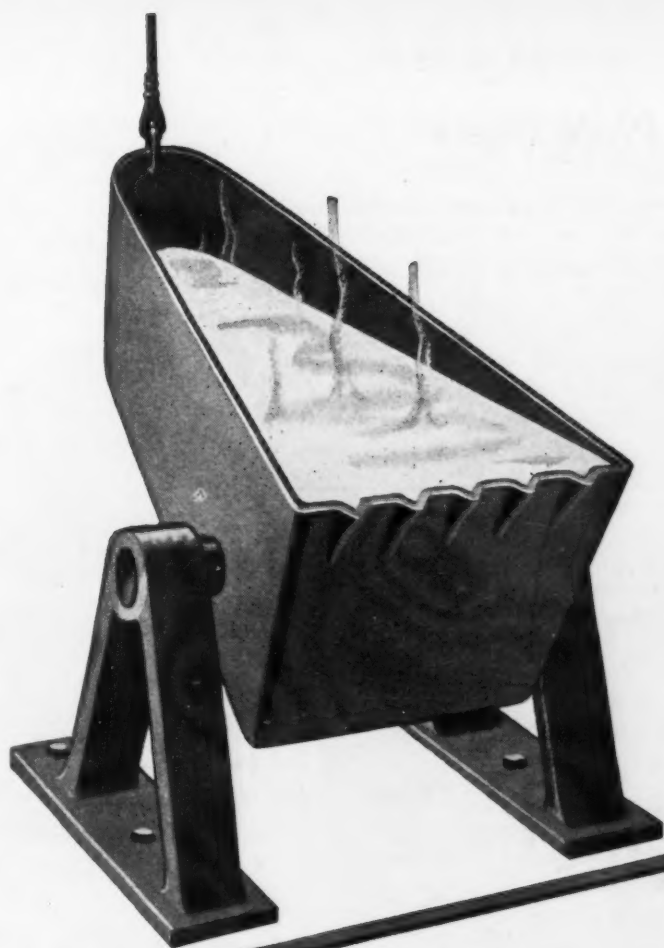


Beatty designs and builds heavy duty punches, shears, coping machines, forcing presses, extruding presses, hydraulic forming presses, bulldozers

Widely used by shipbuilders, and other fabricators of heavy metal, the Beatty 400-Ton Hydraulic Forming & Flanging Press has the power, speed and adaptability to break production bottlenecks. Of very latest design, this unit, with its unique type pump and valve design, eliminates the need for cooling coils, with their inherent threat of water entering the oil supply line. If you work in heavy metal, there is a Beatty machine to help smooth out your production wrinkles. Write us.



BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA



THE "COPPER BAR" CASE

—and how Hele-Shaw Fluid Power Engineers Solved it

In a certain copper refinery, whose name you would instantly recognize, they were having trouble. Continuous pouring of copper bars was yielding more than an allowable percentage of rejects. The guilt was traced to an electrical device tilting the ladle. The device, it was found, was jerking and jarring the ladle and shimmying the flow of metal.

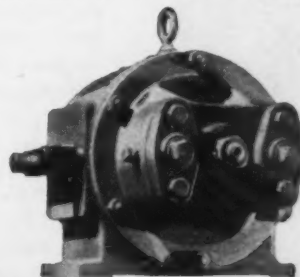
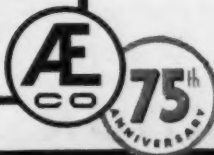
They had a hunch Fluid Power could help them, so they called in our engineers.

Hele-Shaw engineers studied the "case" and recommended a hydraulically operated lift for the ladle, powered by a special hand-lever controlled

reversible Hele-Shaw pump. That was in 1935. Thereafter, the ladle tilted and poured with the satin smoothness characteristic of Fluid Power. The device and the Hele-Shaw pump have been on duty ever since. Other metal refineries, in fact, eagerly duplicated it.

Yours may be an entirely different reason for looking into Fluid Power—but with equal opportunities for success. If you have a notion Fluid Power may improve a product or process, or simplify the control or operation of a machine in your post war planning, ask Hele-Shaw engineers to tackle the job.

THE
Hele-Shaw
Fluid Power Pump



OTHER A-E-CO PRODUCTS: TAYLOR STOKERS,
MARINE DECK AUXILIARIES, LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE • PHILADELPHIA, PA.

THE IRON AGE, April 29, 1943—111

Pricing Eased for Black Plate Users

Washington

• • • A method which producers may use to establish maximum prices for articles made of black plate (instead of tin plate) without applying to Washington for authorization, is provided by OPA in Order No. 414 under Section 1499.3(b) of the General Max-

imum Price Regulation, effective April 26.

The method is to deduct the delivered cost of tin plate per unit, when tin plate was last used, from the ceiling price of the article as made of tin plate, and to add to the result the delivered cost of black plate per unit, in-

cluding enamel if any is used. The sum is the ceiling price of the black plate article.

Firthite Reduces Sintered Carbides Again

Pittsburgh

• • • Firth-Sterling Steel Co., McKeesport, Pa., this week announced another reduction in the price of Firthite Sintered Carbides. A special "War Discount" of 10 per cent will apply for the balance of 1943 on Firthite in all forms including tips and blanks, milled-and-brazed tools, general purpose tools and standard and special tools, the company announced. The discount will apply to all unfilled as well as current and future orders.

Harry Camp Quits OPA

Washington

• • • The resignation of Harry F. Camp, OPA Regional Administrator in San Francisco, and the appointment of Frank E. Marsh as his successor was announced last Friday by Price Administrator Prentiss M. Brown.

WPB Clarifies Order Conversion With Allotments

Washington

• • • Orders for controlled materials placed before the purchaser has received his allotments may be converted into controlled material orders when allotments are received, by furnishing the supplier with duplicate copies of the purchase orders, certified as provided in CMP Regulations. This was made clear by Interpretation 5 of CMP Regulation No. 1 announced on Monday. Orders thus converted must be treated as authorized controlled materials orders as of the date on which the certification, including the allotment number, is furnished the supplier, not as of the date on which the order was first placed.

Sharon Nets \$445,564 In First Quarter of 1943

• • • Sharon Steel Corp. reports for the three months ended March 31 a net profit of \$445,564. Total sales amounted to \$10,997,315. Deductions for state and Federal taxes amounted to \$595,564 after allowing \$162,000 as a postwar credit.

• In the building program of the rapidly expanding aircraft industry, Dravo Direct Fired Heaters are receiving substantial recognition. It is fitting that so modern a heating method should figure in the growth of this era's most significant industry.

For Dravo Direct Fired Heaters are as modern as flying! Compact and self-contained, they efficiently convert fuel into heat and quickly distribute it in the area where needed. The Dravo Direct Fired Heating system excels the usual steam heating system:—its light weight saves large quantities of scarce metals, its factory construction minimizes the man hours needed for actual installation, its high heat transfer efficiency reduces fuel requirements as much as twenty to twenty-five per cent!

Let us send you a general catalog (505) describing the range of sizes and types, as well as a special bulletin (506) setting forth the savings in critical materials that the modern heating system brings to industry.

DRAVO CORPORATION

Heater Department

DRAVO BUILDING

PITTSBURGH, PA.

Fifty-five Sales Offices in Principal Cities

Ore Goal Maintained Despite Lake Delays

Cleveland

• • • In spite of weather conditions on the Lakes which delayed downlake shipments of iron ore about a month, with a loss of about 7,000,000 tons of ore, Washington apparently is confident that a newly revised quota of 94,000,000 tons of ore will be met this year. The 95,000,000 goal announced several weeks ago, which was a revision of an original 100,000,000 ton goal, was set based on the expected 24,000,000 ton downlake stocks, but with an actual 25,000,000 tons stock, the goal was again revised.

The fourth of the 16 Maritime Commission ore boats, the John T. Hutchinson, was launched by American Ship Building Co., on Saturday. The first of these boats will go into service shortly.

The new MacArthur locks at Sault St. Marie, Mich., which will be the only locks that can accommodate the Maritime Commission's and the Pittsburgh Steamship Co.'s new boats fully loaded, will be opened on July 4.

Aluminum Castings Given CMP Status for April Delivery

• • • Because in many cases, users of aluminum castings have not received allotment numbers from the Claimant Agencies in time to extend them to producers of castings, WPB has given the status of authorized controlled materials orders to orders for such castings for April delivery on Form PD-26A. This action was taken by Direction 7 under CMP Regulation No. 1, effective April 24. Users of castings are expected to apply the form approvals for delivery in April against their second quarter CMP allotment in arriving at the figure they may be permitted to purchase during the remainder of the quarter.

The direction also makes clear that orders for aluminum castings, approved on Form PD-26A for delivery during a month prior to April will expire on April 30 if delivery has not been completed within the time limit specified on the form. However, such orders may be re-approved by filing a supplemental application of Form PD-26A, if additional allocations of primary metal are not involved.

Aluminum foundries will not be permitted to accept new orders for castings specifying delivery during May or thereafter, unless such orders are authorized controlled material orders.



not a dud in
a carload!

The original of a spring much like the one illustrated above is so small that a single pound of cadmium plated music wire produces ten thousand of them.

These tiny springs are so accurately designed and manufactured that they release the firing pins of a shell only when it has attained a predetermined velocity. That's why our boys handle high explosive so nonchalantly—but once on the way there isn't a dud in a carload!

Does your product require perfection? Then—

Write, wire or better still
... phone us.

AMERICAN
SPRING OF
HOLLY, INC.
HOLLY, MICHIGAN



More
BEARING
Mileage

WITH
STROM
STEEL BALLS

In America's vast war production program Strom steps up its untiring energies to the mastery of one thing. For over a quarter century Strom has concentrated on Metal Balls. Today, through a series of lapping operations, Strom Balls possess a degree of surface smoothness and sphericity that is unequalled in any other regular grade of ball.

Correct hardness, physical soundness and size accuracy in all Strom Balls is assurance of More Bearing Mileage. For longer trouble-free bearing life specify Strom Metal Balls in ALL ball bearings.

Largest independent and exclusive
Metal Ball Manufacturer

Strom

STEEL BALL CO.

1850 South 54th Avenue • Cicero, Illinois

Wave of Strikes Threaten Production

Chicago

• Carnegie-Illinois Steel Corp. plants in this area have been hit by 14 strikes in the past week ranging from 15 min. sitdowns to three-day work stoppages. No significant cause has been cited and the position of union officials is uncertain as strikes have not been "authorized" nor very def-

initely halted. Some observers see in these "causeless" strikes a showing of strength by the union.

Birmingham

• UMW members here served notice April 26 of the cancellation of the union's temporary agreement with mine operators to take effect April

30. At the time of notice, 4000 out of about 22,000 miners were absent from jobs and the mines of Republic Steel, Sloss-Sheffield Steel & Iron, Tennessee Coal, Iron & Railroad and Woodward Iron were suffering shut-downs or delays. The temporary agreement had been based on a presumed settlement for the entire Southern coal fields which has not been reached in the New York negotiation sessions.

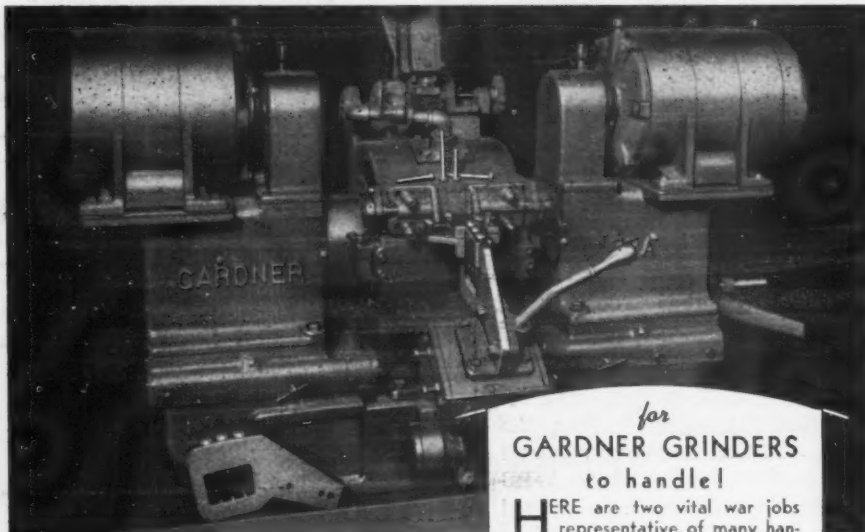
Cleveland

• Four strikes in the coal mines of Republic Steel Corp. in western Pennsylvania have placed about 1900 miners on the idle list. Republic officials state that the strike seriously threatens the production of coke with equally damaging result on iron and steel capacity.

Pittsburgh

• Steel production at Pittsburgh was threatened early this week when close to 10,000 captive miners were on strike in western Pennsylvania. Late Tuesday some controversies had been cleared up but tension was still running high. If these strikes are a straw in the wind indication of a national walkout, steel output will be severely affected here since both coal and coke stocks are low and blast furnace output although high is needed to keep the present ingot rate going.

WANTED: more War Jobs like these



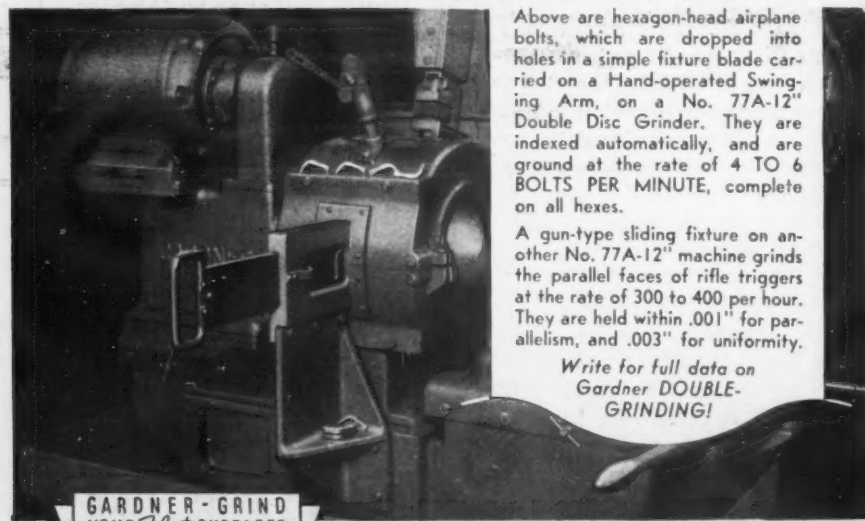
for GARDNER GRINDERS to handle!

HERE are two vital war jobs representative of many handled on Gardner Grinders.

Above are hexagon-head airplane bolts, which are dropped into holes in a simple fixture blade carried on a Hand-operated Swinging Arm, on a No. 77A-12" Double Disc Grinder. They are indexed automatically, and are ground at the rate of 4 TO 6 BOLTS PER MINUTE, complete on all hexes.

A gun-type sliding fixture on another No. 77A-12" machine grinds the parallel faces of rifle triggers at the rate of 300 to 400 per hour. They are held within .001" for parallelism, and .003" for uniformity.

Write for full data on
Gardner DOUBLE-
GRINDING!



GARDNER - GRIND
YOUR Flat SURFACES

GARDNER MACHINE COMPANY

412 East Gardner Street • • • Beloit, Wisconsin, U.S.A.

A Zoot Keg with a Reet Head Needed

Pittsburgh

• • • With emphasis on government specifications, nail makers have been thrown for a loss recently by the injection of federal specifications on nails FF-N-101 into Army Ordnance orders for nails.

This specification includes a paragraph for containers which reads, "Containers shall be substantial and so constructed as to preserve the contents in good condition; they shall be so made that the contents may be removed without destroying the container." Nail manufacturers are taking exception to this and offering material on the basis of standard kegs to be submitted.

One wag has suggested that the only container which could possibly fulfill the above specifications would be a deep-freeze unit with a screw top.

Railroad Purchases Of Iron and Steel Drop by \$23 Million

Washington

• • • Iron and steel purchases by Class I railroads in 1942, according to the Association of American Railroads, aggregated \$435,089,000, a decrease of \$23,058,000 under 1941.

Total buying of the railroads in 1942, covering fuel, material and supplies, showed an increase over 1941, rising to \$1,259,811,000 from \$1,161,274,000, but capital expenditures last year also showed a decrease under those of 1941. In 1942 capital expenditures were \$534,897,000, as against \$543,021,000 previously.

In the iron and steel category, there were increased purchases of some products last year over 1941, the largest increase being in wheels, axles and tires, which amounted to \$41,501,000 or \$4,588,000 over 1941. Rail purchases last year rose to \$55,647,000 from \$52,234,000, but purchases of heavier rail declined to \$33,100,000 from \$36,180,000 in 1941.

The sharpest decline in 1942 purchases was in miscellaneous lines of iron and steel.

Freight car purchases in 1942 amounted to \$201,112,000, a decline of \$44,601,000 under 1941. Locomotive purchases rose to \$113,834,000 from \$80,607,000. Purchases of non-ferrous metals in 1942 declined to \$28,929,000 from \$32,385,000 in 1941.

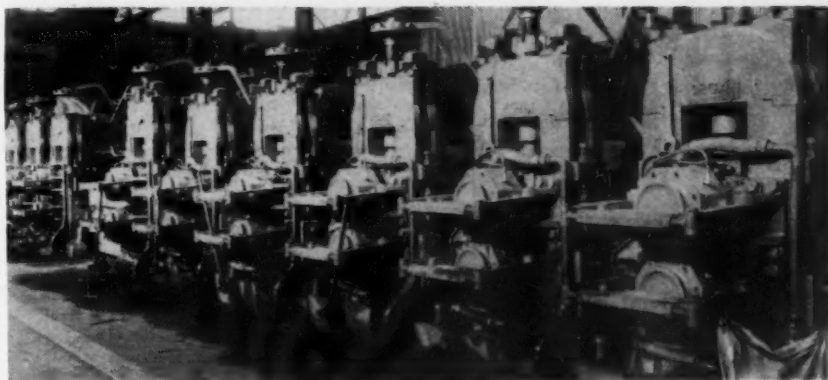
PI Orders Established Under CMP Regulations No. 1

• • • Deliveries of steel from one producer to another, when the purchasing producer resells it at the mill price together with steel of his own production, were authorized by WPB on Tuesday in Direction No. 6 under CMP Regulation No. 1. Orders on which such deliveries are made must be endorsed "PI," meaning "Producers Interchange." Previously, the regulation permitted such deliveries only when the steel was to be used by the purchasing producer for further conversion.

A controlled materials producer may reject such orders, but may not discriminate between customers in rejecting or accepting them. Such orders are not deemed authorized controlled material orders until accepted by the producer.

Purchases of Iron and Steel Products by Class I Railroads

	1942	1941
Steel rail (new and second hand).....	\$55,647,000	\$52,234,000
Wheels, axles and tires	41,501,000	36,913,000
Frogs, switches and crossings, and parts of same...	16,978,000	16,034,000
Track fastenings, track bolts, spikes, etc.	53,349,000	51,740,000
Iron bridges, turntables and structural steel	3,183,000	3,638,000
Bar iron and steel, spring steel, tool steel, shapes, wire netting and chain, boiler, firebox, tank, and sheet iron and steel	27,120,000	49,491,000
Forgings and pressed steel parts for locomotives ...	4,514,000	4,077,000
Car forgings, iron and steel, and fabricated or shaped steel, for cars	16,963,000	17,001,000
Flues and tubes	6,674,000	7,590,000
Interlocking and signal material	21,245,000	21,199,000
Telegraph, telephone and radio material	4,213,000	4,718,000
Bolts, nuts, washers, rivets, lag screws, etc.	13,452,000	16,312,000
Springs, helical and elliptical	5,174,000	4,813,000
Locomotive and car castings, beams, couplers, frames, car roofs	61,359,000	67,501,000
Track and roadway tools, all kinds, wire fencing, Motor, hand, push and velocipede cars	9,174,000	9,426,000
Machinery and repair parts	4,066,000	4,402,000
Machinery, boilers, repair parts and all other iron and steel products	11,980,000	11,970,000
Pipe, iron and steel, and fittings, all kinds	7,642,000	9,722,000
Hardware, all kinds, including nails	5,074,000	6,181,000
Hand and small machine tools	10,107,000	10,906,000
Air brake material	25,363,000	23,254,000
Standard and special mechanical appliances	18,730,000	19,160,000
Automotive equipment and supplies	9,581,000	7,865,000
Total iron and steel products	\$433,089,000	\$456,147,000



NEW ROD MILL ON WEST COAST: The new continuous rod mill opened April 26 at the Pittsburg, Cal., Works of Columbia Steel Co., a subsidiary of U. S. Steel Corp., has 21 stands, divided into 9 roughing stands, 6 intermediate roughers and 6 finishing stands. Above are the first 9 roughers. Three strands of rods are shown below being looped from the continuous roughing stands into the semi-continuous intermediate stands. Rods run through the last of the finishing stands to the reels at a rate of 48 miles per hour.



Concrete Storage Tanks Replace Steel; Eliminate Plates and Shapes

Washington

• • • Reducing steel requirements by more than 50 per cent and using rods instead of critical plates and shapes, the Navy announced on Monday that it is now building hundreds of concrete tanks in which to store its gas and oil. Previously the Navy built steel tanks. The concrete tanks are being built underground.

It was pointed out that concrete usually has had two disadvantages which militated against its effective use for liquid storage. One was its disposition to develop cracks from changes in temperature. Through these cracks liquid could escape. The other was the porosity of the concrete itself, which permitted seepage.

To counter the first of these disadvantages, the Navy adapted pre-stressed concrete to its use. To offset the second, the Navy, in cooperation with industry, developed various types of linings for the inside of the tanks which in effect form a big envelop containing the stored fuel and keeping it from seeping through the porous concrete.

"Engineers have known for decades

that concrete could be pre-stressed, a method of drawing the concrete tighter by pressure so that expansion and contraction from temperature changes, and the accompanying tendency to develop cracks, would be held to a minimum," a Navy statement said. "Steel rods around the concrete are tightened once the material is dry. The Navy, however, has developed a new process in which the earth fill around the underground tank is so engineered that it plays an important part in balancing the stresses.

"For storing heavy fuel oil, it was found that all that was necessary was to paint the inside of the concrete tank with waterglass. This, together with the wax in the fuel, sealed the pores."

For diesel oils and gasoline, three different types of lining materials were developed. One type is a vinylite plastic, painted on the interior of the tank. Another is sheet thiokol, cemented to the interior. The third type consists of thiokol in latex form and a layer of cotton fabric. The latex thiokol is first painted on the inside of the tank. Then the layer of

fabric is imbedded on the latex. Subsequently thiokol is applied over the fabric.

These methods were declared to have worked so successfully that high-octane gasoline can and now is being stored in concrete underground tanks.

Maritime Commission Awards 929 Merchant Ship Contracts

Washington

• • • The Maritime Commission last week awarded contracts for the construction of 929 merchant ships, including 411 new design "Victory" ships, 234 high speed tankers, 247 Liberty ships, 10 C-3 and 27 C-2 ships. The awards include:

Marinship Corp., Sausalito, Cal., 36 tankers; Kaiser Co., Swan Island, Portland, Ore., 47 tankers; Kaiser Co., Vancouver, Wash., 48 tankers; California Shipbuilding Corp., Wilmington, Cal., 20 Liberty and 84 Victory; Oregon Shipbuilding Corp., Portland, Ore., 17 Liberty and 105 Victory; Sun Shipbuilding & Dry Dock Co., Chester, Pa., 75 tankers; Ingalls Shipbuilding Corp., Pascagoula, Miss., 10 C-3; North Carolina Shipbuilding Co., Wilmington, N. C., 27 C-2.

Bethlehem-Fairfield Shipyard, Baltimore, 15 Liberty and 112 Victory; Permanente Metals Corp., Richmond No. 1, Richmond, Cal., 25 Liberty and 35 Victory; Permanente Metals Corp., Richmond No. 2, Richmond, Cal., 6 Liberty and 75 Victory; J. A. Jones Construction Co., Panama City, Fla., 57 Liberty; J. A. Jones Construction Co., Brunswick, Ga., 55 Liberty; Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., 28 tankers, and St. John River Shipbuilding Co., Jacksonville, Fla., 52 Liberty.

Vigorous Push for Metals Continues

New York

• • • High priority recently was established on quantities of high grade tantalite for air transport. Tantalum-bearing slags in a foreign country are being negotiated for and a pilot treatment plant probably will be erected.

A discovery of tantalum ore in New Mexico by a private geologist, was announced April 23. Research work was conducted by the Bureau of Mines in its pilot plant at Rolla, Mo. Thirty tons of ore were handled and more than three tons of high-grade concentrate were produced. The concentrate is being stockpiled at Rolla awaiting removal by the Metals Reserve Co., which is paying the geologist \$3.50 a pound, or \$7,000 a ton, for the beneficiated material.

Carbides of tantalum are used in wire-drawing dies, in steel-cutting tools, in wear-resistant parts of machines, and in dies for cold-chamber casting of artillery shells. Because of its power to resist corrosion, tantalum is in high demand by

manufacturers of surgical and dental instruments, electrical contacts, pump and valve parts, and temperature control apparatus.

Strenuous efforts are planned to help increase the supply of tungsten and also to expand facilities for the production of tungsten wire. Some authorities at Washington are understood to be favoring advance payments against subsequent ore deliveries from two properties in California, in order to help finance development work.

Several steps have been urged recently to help increase nickel and manganese supplies. These moves include requesting top priorities to complete mining projects, and the curtailment of less essential ship cargoes so that more ore can be brought to the United States.

Due to the anticipated restriction of metallurgical chrome imports this year, steps are underway toward the degrading of high-carbon ferro-chromium to conserve high grade ores.

U. S. Steel Reports Net of \$15,406,597

New York

• • • Net income of U. S. Steel Corp. and subsidiaries for first quarter of 1943 was reported Tuesday as \$15,406,597 compared with earnings of \$27,921,534 in the first quarter of 1942. Directors declared a dividend of \$1 per share on the common stock payable June 19 to stockholders of record May 20 and quarterly dividend of \$1.75 per share on the preferred stock payable May 20 to stockholders of record April 30.

Shipments of finished steel products in first quarter of 1943 at 5,149,982 net tons were slightly higher than in the first quarter of 1942. Sales in revenues in first quarter of 1943 were \$439,757,709 against \$432,421,560 in first quarter of 1942. Dollar sales in revenues were reported on a quarterly basis for the first time.



Cited for Award

• • • The following companies have been recently awarded the coveted Army-Navy "E" award:

LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa.
 Park Works, Crucible Steel Co. of America, Pittsburgh.
 Hendrick Mfg. Co., Carbondale, Pa.
 Manning, Maxwell & Moore, Inc., Bridgeport, Conn., and Boston.
 Cutler-Hammer, Inc., five plants, Milwaukee.
 Kelley-Koett Mfg. Co., Covington, Ky.

Porcelain Metals Corp., Louisville.
 American Foundry Equipment Co., Mishawaka, Ind.
 Whiting Corp., Harvey, Ill.
 Union Metal Mfg. Co., Canton, Ohio.
 Westinghouse Electric & Mfg. Co., District Mfg. and Repair Plant, Newark, N. J.
 Annapolis Yacht Yard, Inc., Annapolis, Md.
 Arlington Millwork Co., Arlington, Va.
 Blaw-Knox Co., Lewis Foundry & Machine Division, Groveton, Pa.
 Blaw-Knox Co., Martin's Ferry Division, Martins Ferry, Ohio.
 Brown & Root, Inc., and W. S. Bellows Construction Co., McAlester, Okla.
 A. M. Byers Co., Byers Plant, Economy, Pa., and Southside Plant, Pittsburgh.

Crucible Steel Co. of America, Halcomb Works and Emerson Avenue Works, Syracuse, N. Y.
 Dow Chemical Co., Freeport, Texas, and Dow Magnesium Corp., Velasco, Tex.
 Geometric Tool Co., New Haven, Conn.
 Goodyear Aircraft Corp., Arizona Division, Litchfield Park, Ariz.
 I. F. Laucks, Inc., Plant No. 1, Seattle.
 Lombard Governor Corp., Ashland, Mass.
 W. F. Mosser & Son, Allentown, Pa.
 National Battery Co., Depew, N. Y.
 New England Tape Co., Inc., Hudson, Mass.
 Patch-Wegner Corp., Long Island City, N. Y.
 Pennsylvania Salt Mfg. Co. of Washington, Tacoma, Wash.
 Reliance Mfg. Co., Beacon Plant, Logansport, Ind.
 Rice Barton Corp., Worcester, Mass.
 Sullivan Machinery Co., Michigan City, Ind.
 Pratt & Whitney Aircraft Division of United Aircraft Corp., Willimantic, Conn., and Longmeadow Plant, East Longmeadow, Mass.
 Union Boiler & Mfg. Co., Lebanon, Pa.
 United Welding Co., Middletown, Ohio.
 Universal Engineering Co., Frankenmuth, Mich.
 Plomb Tool Co., Los Angeles, Cal.
 Rau Fastener Co., Providence.
 Rohr Aircraft Corp., Chula Vista, Cal.
 Studebaker Corp., Aviation Division, Chicago.
 Studebaker Corp., Aviation Division, Fort Wayne, Ind.
 Studebaker Corp., Aviation Division, South Bend, Ind.
 Traylor Engineering & Mfg. Co., Allentown, Pa.
 Republic Drill & Tool Co., Chicago.
 Revolution Cotton Mills, Greensboro, N. C.
 Rheem Mfg. Co., No. 1 Chicago Plant, Chicago.
 Standard Steel Spring Co., Plants 1, 2 and 3, Coraopolis, Pa.

Maritime Commission "M"

Bethlehem Steel Co., Brooklyn-56 Street ship repair yard, Brooklyn.

Navy Amends Physical Requirements On Strip Mill Plate to Aid Production

Washington

• • • As forecast in THE IRON AGE of April 22, the Navy has established a flat minimum tensile strength of 58,000 lb. per square inch for plates

See story on lower safety factors for strips, page 90.

rolled on strip mills. In doing so it eliminates the average strength of 60,000 lb. with a minimum of 57,000 lb. on tests.

This was the principal change in amendments in specification for strip mill rolled plates for use in the Naval building program. The changes were made, said a Navy announcement, as a means of speeding production of this type of steel. The changes were the outgrowth of a lag in production due to too rigid tests that followed hearings before the Truman Senate Committee in the Carnegie-Illinois Steel Corp. case. This letdown in production caused so much concern in Washington that WPB Chairman Donald M. Nelson directed a telegram to steel mills cautioning them against

too rigid tests of plates and asking that they only keep within the tolerances. These tolerances now are swept away by raising the old minimum and abandoning the old average procedure.

An adjustment also was made in elongation requirements, with the establishment of a flat minimum of 21 per cent, which varied heretofore according to the weight of plates. The yield point was retained at 30,000 lb. per square inch. Other changes made deal with the technical details of the sampling and testing.

The change in specifications was promulgated in a letter from the Chief of the Bureau of Ships.

Turnings Charged With Pusher Boxes

(Concluded from Page 45)

is not sufficient roof clearance to permit it being dumped.

It should be mentioned that these special charging units, the box and the car, are of original design.

Several improvements have been suggested, some of which are about to be added. One improvement that will be made consists of raising the box floor to effect a better discharge into the furnace. This height is limited because of interference with the charging machine. It is believed that by further refinement of the special charging car, it will be possible not only to equal the regular charging time, but actually to save time in charging crushed turnings or other reasonably fine scrap through the early part of the charge. Obviously, the last scrap added to the furnace will have to be done with conventional charging boxes in order to distribute it back away from the doors and to permit leveling off of the charge.

Using six or eight of the special charging cars for the early part of the charge, the estimates of actual charging time are shown in the accompanying table. These values are based on average crushed and uncrushed turnings. The ratio shown between the special charging car and small boxes will not only maintain but will increase in favor of the large box in the event of handling bushy or uncrushed turnings.

Beryllium Wanted

(Concluded from Page 46)

expansion is projected for other beryllium products.

Beryllium in Other Alloys

A great deal of work has been done toward the development of a suitable aluminum-beryllium alloy, reports the committee. Tests show that hot strength is considerably above that of other aluminum alloys. Thermal conductivity is also of a high order and thermal expansion is low, properties favorable for aircraft pistons and other engine parts.

There has been some progress in producing workable ingots of approximately 35 per cent beryllium weighing 10 or 15 lb. Small instrument parts and various specialties requiring low density, stiffness and good machinability could be manufactured from these small ingots, but the cost would be high. The availability of aluminum-base beryllium alloys for major items of aircraft or engine construction cannot be seen around the corner and should not be viewed as a wholly probable short-time outcome of present efforts.

A small amount of beryllium has been reported helpful in magnesium base castings. The total quantity of beryllium required for this purpose is small, since beryllium is almost insoluble in molten magnesium at all temperatures.

Physical properties of nickel-beryllium alloys are good, but obtainable in other alloys of nickel at lower cost.

Beryllium oxide fired to be used as a refractory material is extremely strong and hard and very resistant to thermal shock. Its melting point is 4658 deg. F., 900 deg. higher than that of alumina. In combination with other oxides, it confers upon the mix-

ture its own quality of electrical resistance at elevated temperatures.

In spite of its high thermal conductivity, but because of its great stability, beryllium oxide when finely divided is an excellent heat insulator for high temperature furnaces and especially for high frequency insulation where electrical conductivity may be undesirable.

Beryllium oxide is the most important fluorescent material used in fluorescent lamps. Materials having the property of transforming radiation of a given wave length into radiation of longer wave length are now referred to as "phosphors." Beryllium phosphors are used in about 92 per cent of the present production of fluorescent lamps. They are also used in smaller quantities in X-ray screens, television and other cathode-ray tubes.

One pound of beryllium oxide is sufficient for more than 4000 fluorescent lamps. About 10,000 lb. of beryllium oxide annually will be needed for phosphors.

The best substitute now known for beryllium as a phosphor in fluorescent lamps is cadmium. Besides requiring 18 times more cadmium oxide than beryllium oxide, the initial light output is 20 per cent lower with cadmium, and the maintenance of initial light output is only 73 per cent of that of the beryllium phosphor at the end of 500 hr. It will be preferable to pay considerably higher prices for beryllium phosphors than to use cadmium.

Beryllium metal is used to make vacuum tight windows for X-ray tubes. The metal is first made in a vacuum melting equipment and cast into small ingots. The metal can then be hot rolled, the rolled pieces having a very slight cold plastic bendability. They can be mounted as windows in X-ray tubes and have the advantage

of transmitting soft X-rays ten to twenty times as well as the next best material.

Consumption and Output

Present consumption of beryl ore is at the rate of about seven tons a day and may reach 20 tons a day this year, if adequate supplies are obtainable. It is now estimated that at least 8000 tons will be needed in 1944.

The 1941 consumption of beryllium ore was about 2500 tons, mostly imported from Brazil and Argentina. The present U. S. stock of ore in private companies now totals about 2500 tons and can last at present consumption rates until this summer.

A 3000-ton stockpile has been authorized by the WPB, but only small deliveries have been made as yet. However, the Metals Reserve Co. has a general underwriting agreement with Brazil and recently has placed orders and bids on shipment from several countries. The committee recommends a 10,000-ton MRC stockpile.

World production of beryllium is shown in Table I, and domestic supplies in Table II. The Brazilian ore, which comes from two rather large deposits inland from the southeastern Atlantic shoreline, can be transported only from May to December, because of tropical rains. The Argentinian ores are scattered; no imports have been reported in the U. S. from Argentina since January, 1942, but some shipments are now understood to be scheduled. Every effort, says the committee, should be made to increase production from western hemisphere mines.

Domestic sources of the ore are in California, Colorado, Idaho, Nevada, New Mexico, South Dakota, Utah and New England, most of them negligible.

Most beryllium ore has been obtained as a by-product of mica, lithium and feldspar. In addition to beryl in larger crystals, the discovery of new deposits of diffuse ores is needed. These ores are relatively unknown and the search for them must be carried on shot-gun fashion by testing large numbers of suspects or even less than suspects.

The flotation process of concentration of beryllium minerals has not been applied to beryllium ores on any commercial scale as yet. However, Bureau of Mines laboratory tests show promise in concentrating beryl by froth-flotation when and if sufficiently large and uniform deposits are located. Electrostatic concentration, says the report, should not be overlooked.

TABLE II
Domestic Supplies of Beryllium Ore
(Net Tons)

Imports From	1937	1938	1939	1940	1941	1942*
Argentina.....	153	78	384	422	861	1700
Brazil.....			75	377	1805	2500
India.....	30	58				500
Africa.....		10		6		50
Canada.....						50
Domestic production (estimated)	75	25	95	125	150	200
Total.....	258	171	554	930	2816	5000

*Estimated maximum. Actual imports for the first five months totaled 1132, against shipping quotas of 6200 tons.

PERSONALS

• **Daniel Lewis** has relinquished active direction of the roll department of Continental Roll & Steel Foundry Co., East Chicago, Ind., but will continue his connection with the company as a consultant. Mr. Lewis' duties have been assumed by **William E. Cadman**, as manager of roll sales and **Arthur E. Murton**, as roll manager. Mr. Lewis has been associated with the company since 1927 and has been active in the industry since his high school days, when he worked in the laboratory of the Lorain Steel Co., Lorain, Ohio.

• **A. D. Lewis** has been named West Coast service and sales representative for Progressive Welder Co. Prior to his joining the company he was with Fisher Body Division, in its tool design division, at Detroit, and acted as West Coast general manager for Knu-Vise, Inc., Glendale, Calif. He will continue to hold this latter post, since sales and service representation for Knu-Vise plants are handled by Progressive.

• **Peter F. Rossman**, chief of development research in the airplane division, has been made general manager of a new development division being established by Curtiss-Wright Corp. in New Jersey. The new unit will provide a means of implementing collaboration on engineering problems relating to the other three divisions and will anticipate the development of new products and new markets in the post-war period.

• **George M. Stevens** has been made manager of the General Electric Co., Lynn, Mass., River works, and **Nicholas M. DuChemin** manager of the West Lynn Works. Both have been acting managers since the death of Nelson J. Darling.

• **William H. Worrilow**, president of the Lebanon Steel Foundry of Lebanon, Pa., was elected a director of the Armstrong Cork Co.

• **James T. Buckley**, president of Philco Corp., has been elected to the newly-created office of chairman of the company's executive committee. **John Ballantyne**, who has been serving as vice-president in charge of operations, has been named president of the company. **M. W. Heinritz**, formerly general manager of the company's storage battery division, was appointed vice-president in charge of

the division, and **Charles F. Steinruck, Jr.**, assistant secretary, was elected secretary in place of George E. Deming, who died April 15.

• **Albert R. Benson**, assistant secretary and assistant treasurer, has been elected corporation secretary of Stewart-Warner Corp., Chicago. He replaces **Lynn A. Williams, Jr.**, who continues as vice-president.

• **Robert S. Gruwer** has been named manager of the Askland, Ky., Division of the American Rolling Mill Co.

• **W. C. Bobbitt** has been named assistant manager of sales in the Philadelphia district sales office of the Carnegie-Illinois Steel Corp.

• **Ted Nagle** has been appointed sales promotion and advertising manager of Sav-Way Industries, Machine Tool Division, Detroit. Mr. Nagle was with General Motors and Bendix Aviation Corp., and before this recent connection was president of his own company, Ted Nagle Equipment Corp.

• **A. L. Patrick**, guiding spirit of the Cleveland Automatic Machine Co. for the past decade, has retired from the office of president. Mr. Patrick's resignation was followed by the election of **Col. James Hammond**, formerly chairman of the board, as president and treasurer, and Mr. Patrick as chairman of the board. **G. V. Patrick**, vice-president, became executive vice-president.

• **John A. Stephens** has been named vice-president, industrial relations, of the United States Steel Corp. of Delaware. Mr. Stephens since 1938 has been director of industrial relations, and in February, 1942, was elected a member of the board of directors and the executive committee.

• **Russell R. Smith**, manager of the Ashland, Ky., division of The American Rolling Mill Co., retired on April 7, because of ill health. He has been succeeded by **Robert S. Gruwer**, formerly assistant manager of Armco's fabricating division in Middletown. **R. G. Adair**, assistant manager of Armco's Ashland division has been appointed assistant director of personal relations, with headquarters in Middletown.

• **L. M. Harris** has been named general sales manager of the Park Chemical Co., Detroit. Mr. Harris has been sales manager of the automotive division of Park Chemical since 1939.

• **John W. Hacker** has been appointed general superintendent of the Christy Park Works, McKeesport, Pa., of the National Tube Co., succeeding **Walter T. Mahla**, who died recently. Mr. Hacker joined this U. S. Steel Corp. subsidiary in April, 1940, as industrial engineer at the National Works, McKeesport, Pa., and in March, 1942, became chief industrial engineer of the company with offices in Pittsburgh.

• **William C. Fork**, superintendent of the hot strip rolling mills of Acme Steel Co., Chicago, has been appointed to the newly created position of general superintendent of the entire Riverdale plant. **Walter F. Hinkle**, assistant hot mill superintendent, will fill the position vacated by Mr. Fork while **James F. Hanihan** will assume the duties as assistant to Mr. Hinkle.

• **Thomas W. Dinlocker** has been elected vice-president and treasurer of SKF Industries, Inc., Philadelphia. **Richard H. DeMott** has been named vice-president in charge of sales, and **C. P. Collins**, secretary.

• **Daniel Lewis** has relinquished active direction of the roll department of the Continental Roll & Steel Foundry Co., East Chicago, Ind., but will continue his connection with the company as a consultant. Mr. Lewis' duties have been assumed by **William E. Cadman**, as manager of roll sales and **Arthur E. Murton**, as roll manager. Mr. Lewis has been associated with the Continental company since 1927.

• **LeRoy L. Wyman**, metallurgist for about 19 years with the General Electric Co. Research Laboratory at Schenectady, has been released for the emergency by his company to join the staff of the War Metallurgy Committee of the National Academy of Sciences—National Research Council, with his principal assignment the direction of research in the fields of non-ferrous alloys used in aircraft and ordnance materiel. His professional interests and activities have covered a wide field in the metal research problems of the General Electric Company. Outstanding in such activities has been his work on hard carbides, steel treatment, heat resistant alloys and refractory materials.

• **J. K. Mahaffey** has become associated with George H. Criss, representing the Baker-Raulang Co. in the Pittsburgh territory. Mr. Mahaffey was Pittsburgh district manager of the Edison Storage Battery division of Thomas A. Edison, Inc., for 26 years.

- **Dr. Walter Savage Landis**, vice-president of the American Cyanamid Co., has been awarded the Gold Medal of the American Institute of Chemists which will be presented at the annual meeting of the Institute to be held in May. This medal, which is awarded annually for outstanding services to the science of chemistry, is being presented to Dr. Landis not only in recognition of his contributions to chemical engineering and development work, largely in the field of nitrogen derivatives, but also for his services to the professional side of chemistry.

- **Frank J. Coughlin** has been named purchasing agent of the Pratt & Whitney division of Niles-Bement-Pond Co., West Hartford. Mr. Coughlin will complete 30 years of continuous service with the company on Nov. 13. He has been assistant purchasing agent since 1928. His predecessor, **Howard H. Wallace**, was forced to relinquish his position because of ill health.

- **Robert W. Pugh** has been appointed superintendent of the coke oven department at the Lackawanna plant of Bethlehem Steel Co., succeeding **Benjamin W. Winship**, who has been granted leave of absence due to illness. **Robert W. Graham** has been appointed superintendent of the electrical department succeeding **Frank D. Egan**, also on sick leave. **Walter J. Widmer** succeeds Mr. Pugh as assistant superintendent of the coke oven department, while **Theodore O. Zittel**, takes Mr. Graham's place as assistant superintendent of the electrical department.

- **Dr. George H. Spencer-Strong** has been appointed director of research of the Porcelain Enamel & Mfg. Co., Baltimore. Dr. Spencer-Strong succeeds **Lyman C. Athey**, who resigned recently to accept the position of vice-president of the International Products Corp.

- **E. O. Wahlstrom** has been appointed head of the new service plant of Koebel Diamond Tool Co., Detroit, that will be opened in Worcester, Mass., to handle business in the Eastern states. Formerly division products engineer for American Steel & Wire Co. at Worcester. Mr. Wahlstrom will be in charge of operations and sales of this new division of Koebel.

- **Richard W. Millar**, former president and director of Vultee Aircraft, Inc., is head of a new aircraft firm known as Avion, Inc., Los Angeles. Other officers and directors include **R. W.**

Palmer and Don I. Carroll, vice-presidents, both of whom resigned from Vultee late in 1942.

- **Thomas J. Adams** has been appointed chief metallurgist of the Columbia Steel Co., Torrance, Cal., plant succeeding the late John Disario.

- **Neil C. Hurley, Jr.**, has been elected executive vice-president of the Independent Pneumatic Tool Co. Mr. Hurley has been associated with the company for 11 years, serving the past four years as vice-president and director. **John A. McGuire** was elected secretary, and **E. R. Wyler** was named vice-president.

- **William W. Klemme**, previously district manager at Buffalo, has been named district manager of industrial sales in Dallas, Tex., for Chain Belt Co.

- **Frank O. Parker**, formerly sales manager of the Acme Steel & Malleable Iron Workers, has been elected to a new vice-presidency of Pratt & Letchworth Co., Inc., Buffalo.

- **Sidney S. Walcott**, president of the Richardson Boat Co., Tonawanda, N. Y., has been elected a director of Feders Mfg. Co., Inc., Buffalo.

- **Leighton W. Rogers**, president of the Aeronautical Chamber of Commerce from 1933 to 1939, has joined Bell Aircraft Corp., Buffalo, as special representative of the company on products in service, particularly in combat zones. Recently Mr. Rogers has been an aviation consultant with offices in New York and Washington.

- **Ray Ayer**, formerly on the central sales staff of A. Vanderzee, corporation vice-president, has been made sales manager in the parts division of Chrysler Corp. **T. E. Waterfall**, formerly superintendent of depot operations, has been appointed operating manager, and **Lee Lewis**, formerly in charge of the Chrysler parts plant at Kansas City, has been appointed assistant operating manager.

- **James Tate** has joined the Dumore Co. of Racine, Wis., as director of industrial marketing and research. Mr. Tate will be responsible for planning Dumore's marketing and manufacturing program in the post-war era.

- **George K. Manning**, metallurgist, has been named to the research staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of metallurgical research. Prior to joining the Battelle staff, Mr. Manning was assistant director of the

metallurgical laboratory of the Chicago plant of the Republic Steel Corp.

- **Jay J. Seaver** has been elected a vice-president of Day & Zimmermann, Inc., engineers, Philadelphia, with branch offices in Chicago and New York.

- **M. A. Williams** has been appointed district sales manager of the new sales office of Copperweld Steel Co. with headquarters in Circle Tower, Indianapolis. The territory will include central and southern Indiana, southwestern Ohio, and the State of Kentucky. Mr. Williams was formerly Indianapolis district sales manager for Republic Steel Corp.

- **Clem G. Trimbach** has been appointed chief of the developments and armament department of Curtiss-Wright's research laboratory in Buffalo. Before going to Buffalo he was at the Curtiss plant at Garden City, L. I.

- **N. R. Knox**, former vice-president of the Bucyrus-Erie Co., Milwaukee, has been elected president to succeed **W. W. Coleman**, who has been head of Bucyrus-Erie for 32 years and who retains the chairmanship of the board of directors. Knox has been with the firm since 1920. **George A. Morison** of Bucyrus-Erie has been advanced from vice-president to vice-chairman of the board of directors. **W. L. Little**, works manager of the Erie, Pa., plant, has been named vice-president and **W. M. Bager**, former vice-president, has been made technical director.

- **Walter Geist**, president of the Allis-Chalmers Mfg. Co., Milwaukee, has accepted the chairmanship of a post war planning committee for the Milwaukee Association of Commerce to provide jobs and rapid conversion to normal production after the war. Mr. Geist also becomes regional vice-chairman of a national economic development commission under **Ralph Budd**, president of the Burlington railway.

- **Francis Trecker** has been elected secretary of the Kearney & Trecker Corp., Milwaukee, by the board of directors. He has been in charge of the firm's huge subcontracting program.

- **Elliot C. Grandin** has been appointed general sales manager and **George C. Johnson**, assistant sales manager of the Titusville Forge division of Struthers Wells Corp., Titusville, Pa. Mr. Grandin is also manager of the ordnance division of the corporation.

• **Emil T. Johnson**, formerly works manager, has been promoted to the position of plant manager of the Lycoming Division of the Aviation Corp., Williamsport, Pa. He has been with Lycoming since October, 1941, as master mechanic, plant superintendent and works manager. Mr. Johnson is succeeded as works manager at Lycoming by **Herbert J. Glasby**, formerly factory manager of the Oakes Products Division of Houdaille Hershey Corp., North Chicago, Ill.

• **William J. Norman** has recently been appointed assistant district manager of the Waverly plant in Newark of the United States Steel Supply Co., U. S. Steel Corp. subsidiary; and **Walter P. McGuire** has been appointed manager of its Philadelphia sales office.

Mr. Norman was first employed by the United States Steel Corp. on November 7, 1912, and Mr. McGuire's service with United States Steel Corp. subsidiaries began in May, 1910.

• **Arthur M. Anderson**, vice-president of J. P. Morgan and Co., Inc., has recently been elected a member of the Board of Directors of United States Steel Corp. and a member of the Finance Committee of the Corporation, succeeding J. P. Morgan who died March 13.

Mr. Anderson became a partner of H. P. Morgan and Co. in 1927, and when the partnership was incorporated in the spring of 1940, he was made vice-president and director.

• **Fred H. Webb** has been appointed district sales manager of the Follansbee Steel Corp., with headquarters at 1299 Union Commerce Building, Cleveland. Mr. Webb, prior to his present association, was with the Youngstown Sheet & Tube Co. in the sales department for the past eight years. Mr. Webb succeeds the late Scott Follansbee.

• **Douglas D. Burnside**, superintendent, American Stove Co., was advanced from second vice-president to first vice-president of the American Society of Tool Engineers at its annual meeting held in Milwaukee, March 25-27. C. V. Briner, assistant to the president, Pipe Machinery Co., Cleveland, was elected second vice-president by the directors. Mr. Briner for 20 years was connected with the Pratt & Whitney Division of Niles-Bement-Pond Co. Election of other officers was covered in the April 1 issue, p. 61.

• **Harry F. Potter** has been elected secretary of Crane Co. Mr. Dwyer joined the Crane organization in 1917

at the Philadelphia branch, becoming manager in 1935. Two years later he was appointed district manager with headquarters in the New York branch. In his new position of manager of branch houses, he will be assisted by **A. H. Prasse**.

• **David J. Molloy**, assistant manager of the New York branch, succeeds Mr. Dwyer as district manager, and will have general supervision of the main branches in Baltimore, Boston, New York, Philadelphia, and Washington, D. C. He, in turn, is followed by **George P. Gregory, Jr.**, as assistant to the manager of the New York branch.

• **Frank J. De Rewal**, former research chemist for the Foote Mineral Co., Philadelphia, has been appointed to the research staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of non-ferrous metallurgy. He began his career in chemistry in 1922 as a research chemist for the Allied Chemical and Dye Corp. of Syracuse, and in the period from 1936 to 1941 operated the De Rewal Consulting Laboratory, Philadelphia.

• **T. M. Cummings**, who has been vice-president of the Progressive Welder Co. since the company was founded, has been named executive vice-president and general manager.

• **Albert S. Rairden** has been appointed sales manager of the Riehle Testing Machine division of American Machine & Metals, Inc., East Moline, Ill. For the past 10 years, Mr. Rairden has been associated with Wickwire Spencer Steel Co., where he was in charge of sales engineering and sales of wire rope. Prior to that, he was chief engineer of American Cable Co. and Hazard Wire Rope Co.

• **C. Hart Miller** and **Alfred Marchev** have been elected directors of the Republic Aviation Corp. Mr. Miller has been with Republic and its predecessor company since 1935. In January, 1940, he was appointed the company's director of military contracts and subsequently elected a vice-president in June, 1942. Joining Republic in February, 1942, as assistant to the president, Mr. Marchev was elected a vice-president the following month. He is also general manager of the company's Farmingdale, L. I., plant.

• **Dr. Robert V. Yohe**, technical superintendent of the chemical division, the B. F. Goodrich Co., Akron, Ohio, has been named plant manager of the government synthetic rubber plant operated by B. F. Goodrich in Ken-

tucky. He succeeds **J. W. Frasche**, who has been named plant manager at another government synthetic plant in Texas which will also be operated by B. F. Goodrich.

• **Frederick W. Bierwirth**, vice-president and telephone sales manager of the Western Electric Co., has been elected a member of the board of directors.

• **Louis F. Sattelle** has been appointed assistant general superintendent of the Lorain, Ohio, Works of the National Tube Co. **Earl C. Tatum**, now assistant general superintendent, will remain in his present position. Mr. Sattelle goes to Lorain from the position of assistant general superintendent, Ellwood City Works.

• **John A. Elmes** has been appointed plant manager of Jones Engineering Co., Ellwood City, Pa. Mr. Elmes was formerly chief engineer of the Keystone Driller Co., Beaver Falls, Pa.

OBITUARY...

• **H. F. T. Erben**, former manager of the General Electric Schenectady works and member of a well-known navy family in whose honor a destroyer was named when launched in Maine two weeks ago, died April 8. He was 77 years old. He was designing engineer of General Electric's direct-current department, and in 1914 became engineer of the Schenectady works, being promoted two years later to assistant works manager. Mr. Erben became works manager in 1920 and four years later was named assistant to the vice-president attached to the general manufacturing department. He retired in 1928.

• **Charles A. Schranz**, manager of the machinery department of the R. D. Wood Co., Philadelphia, for the last 25 years, died March 22 after a short illness, aged 68 years. Mr. Schranz joined the R. D. Wood Co. in 1905 as an engineer. He was also a director of the Florence Pipe Foundry & Machine Co., Philadelphia.

• **Alfred C. Bell**, former vice-president and sales manager for the Wisconsin Bridge & Iron Co., Milwaukee, died recently. He was 72 years old. He began his career with the old Milwaukee Bridge & Iron Co. After a special course in structural steel engineering at the University of Wisconsin, he went to work for the Lafayette Bridge Co., Lafayette, Ind. He later returned to the Wisconsin Bridge & Iron Co.

MACHINE TOOLS

... Sales, Inquiries and Market News

Sales Effort Stimulated by Order Drop

Cleveland

• • • Machine tool activity during the past week or two has fallen into the doldrums of little or no activity other, of course, than that of production, which is continuing at a consistently high rate. New business has been low and sales efforts are again shifting from order taking to real selling. Such sales efforts are, for the most part, scattered over large areas with little or no heavy concentration of activity. There is a great deal of diversity as to source of machine tool orders, with very few of any great size.

Many production jobs are being cleaned up by manufacturers, and this to a great extent is freeing government owned machine tools and equipment for use in other lines. Consequently, there is a general shifting around of machine tools to plants that require additional capacity to either begin new contracts or complete contracts that are behind schedule.

Often a machine tool that is shifted from one plant to another is pretty much an unknown quantity to the plant getting it until it actually arrives at the plant. This necessitates considerable retooling of the shifted

equipment, and at present this is one of the most important activities for the machine tool salesman and dealer. These men are performing a valuable and immediate service in aiding the new holder of the machinery in adapting it to his needs and for the manufacture of his products.

There has been a growing tightness within the past two weeks on external, internal and universal grinders. While up until recently grinders were not too difficult to obtain, deliveries suddenly dropped back to five or six months. This has been accounted for to some degree by the fact that when deliveries of these types of grinders were immediate, sales efforts were extended and the demand quickly caught up with and surpassed the immediately available supply.

Production of armament and armament parts has been undergoing some rather interesting changes—that is to say, the production procedures and techniques. One has been the growing demand for use in production departments for what up until the middle of 1942 was gage laboratory equipment. For example, visual comparators such as those built by Jones & Lamson, Bausch & Lomb, and Port-

man Machine Co., are being used daily in inspecting production run parts.

This type of equipment, it will be recalled, projects on a screen for visual comparison the shadow of the finished part, superimposed on a magnified outline of a perfect part, with or without tolerance bands. Such comparators have long been used in checking threads of oil country pipe, but for the most part were used in laboratory inspections only in establishing standards and tolerances. Now, however, manufacturers of all types of close tolerance parts are using the equipment for regular production inspection.

Likewise, there has been a trend toward lapping of parts to get size and finish. Lapping, heretofore used extensively in gage manufacture, has been brought into the production picture because of the demands by aircraft manufacturers and the air branches of the services for fine finishes on motors and motor parts.

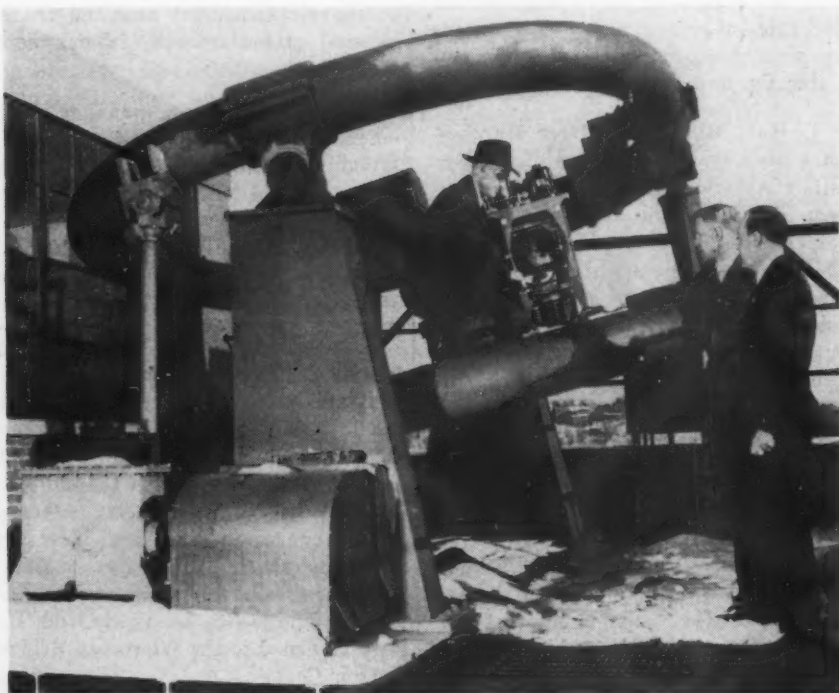
Wider Use of Women Awaiting Changes in Law

Cincinnati

• • • The Machine Tool Market in the Cincinnati area presents no new feature during the present week. Manufacturers indicate that the present flow of orders continues to be at a satisfactory level and that although backlogs are now being reduced, possibilities of a change in the production schedule for the rest of the year is unlikely.

Although the manpower situation is troublesome, so far it has not become critical here. A few plants have female employees in certain departments, but so far this has not become general in the industry. One of the difficulties in the way of female employment has been state statutes which limit the amount of work, the type of work and the physical strain to which women may be put in industry. Recent efforts of the legislature to have the law amended to broaden the scope of employment opportunity in the manufacturing industry generally, has not yet brought fruit. The efforts of industry to change the law were countered by union spokesmen and the proposed bill is still floundering around in the state legislature.

OOPS: All the ups and downs of a warship ploughing the high seas have been built into this Scorsby tester, which simulates roll and pitch during testing of naval equipment at a General Electric plant.



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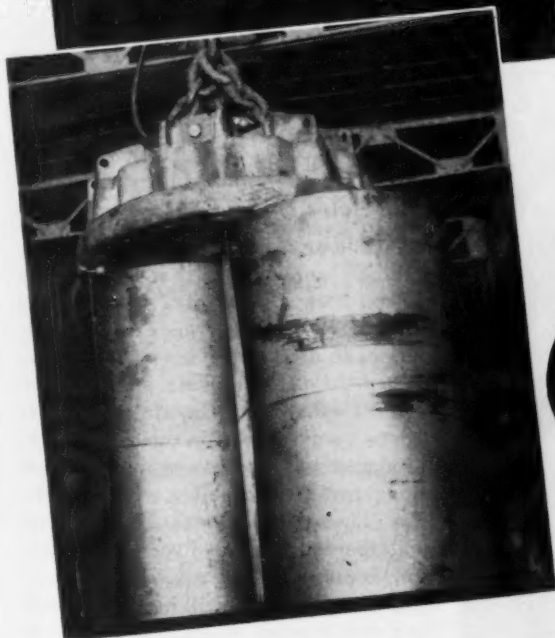
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MAGNETIC SPECIALISTS



WHEN you buy Dings High Intensity Lifting Magnets you are buying a design based on more than 40 years leadership in the development of electro-magnetic equipment. Copper wire and steel are correctly proportioned for maximum lifting capacity with minimum current input. The rugged body and bottom plate are built to withstand hard usage. Structural fins strengthen the body and provide additional heat dissipation. Coils are securely locked in place. Every feature of these magnets is designed to give you longer magnet life at full strength.

For handling pipe, scrap, strip coils, flasks, castings, slabs, structural shapes — specify Dings High Intensity Lifting Magnets. Catalog on request.

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MAGNETS *HIGH INTENSITY*

*Built to give
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POUND LIFTING HOURS

NON-FERROUS METALS

... Market Activities and Prices

WPB Issues Eighth Critical Supply List

• • • WPB's latest edition of its Materials Substitutions and Supply List has been released on April 22. This guide to industry in the conservation of more critical materials through substitution of less critical and non-critical materials gives a comprehensive picture of the current status of materials used in war and essential civilian production. Ranked on the basis of necessity and availability, more than 500 materials are arranged in three groups.

Of the non-ferrous metals, bismuth, cadmium and tin have become relatively more tight. Most critically insufficient in supply are: Aluminum, cadmium, bismuth, tin, magnesium, copper and zinc.

Critical Materials Substitutes

• • • On one item manufactured for the P-51 Mustang fighter, North American Aviation is saving 41,000 lb. of aluminum alloy sheet stock per month by successfully manufacturing

the same item from mild carbon steel sheet. J. H. Kindelberger, president, pointed out to visiting aircraft presidents. Various conversions to plastic materials on the B-25 and P-51 are resulting in a saving of 40,000 lb. of aluminum alloy and steel per month.

One of the most critical items in the aircraft industry at present is aluminum alloy extrusion, but by adapting rolled sections to the B-25 and P-51 in place of the critical extruded sections, North American is saving 40,000 lb. a month of aluminum alloy extrusion stock.

New Manufacturing Techniques

• • • Magnesium is extensively used, not only in the form of castings, but as a prime structural material for portions of the airframe. Experimental work now on a production basis at Northrop Aircraft indicates that magnesium may be used to fabricate the entire airframe.

The technique of welding utilizes

the Northrop developed "Heliarc" torch, which bathes the section being welded in a flow of inert helium, thereby preventing oxidation. Butt welds made by the Heliarc process range in strength upwards from 95 per cent compared to the parent metal.

Northrop is obtaining as high as 12,000 uniform spots in its spot-welding department without cleaning of electrodes, as against 1000 spots, a record insofar as is known of other techniques.

The Northrop method involves controlled precleaning of subassemblies held together with skintights, rather than the cleaning of separate components. The cleaning solutions used require substantially less dipping and rinsing than the conventional process. Close current control is a factor in speeding the operation.

The "Norpro" template duplication process that has been developed at the Northrop Aircraft plant for the production of templates is a process that uses electrolytic etching to reproduce templates and related tools.

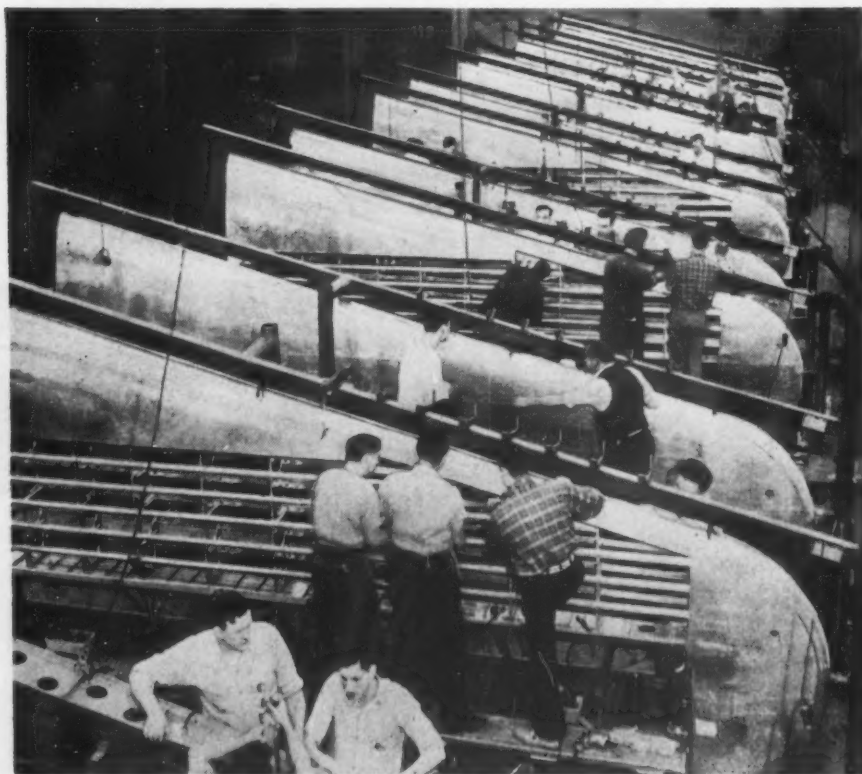
Hinged pressure plates for hydro-press operations are being used. Through the use of this type of pressure plates, consecutive forming operations are possible with but a single stroke of the ram. As many as seven different angles and joggles can be made in one operation.

Northrop has also developed clamping draw dies which create a uniform flow of stock being drawn around a curved die. Through this close control of drawing on curved surfaces subsequent hand working and spoilage can be eliminated.

Tin Sales Corp. Set-Up

• • • Jesse Jones, secretary of commerce, announced that Tin Sales Corp., a subsidiary of Tin Processing Corp., 1270 Sixth Avenue, New York, has been designated agent for Metals Reserve Co. in the sale and distribution of refined pig tin, tin anodes, tin alloys, and other tin bearing metal produced by Tin Processing Corp. at Longhorn Tin Smelter, Texas City, Tex., owned by Defense Plant Corp. and operated by Tin Processing Corp. for account of Metals Reserve. In addition, Tin Sales will handle the sale and distribution of such other tin as

HOLD THAT LINE! Briggs Mfg. Co., Detroit, produces outer wing sections for medium bombers on this automotive-type assembly line.



may be acquired by Metals Reserve from time to time.

The sales corporation is to transact no other business than to act as agent for Metals Reserve and serve without profit. All sales are to be based on allocation certificates issued by WPB.

Each contract for the sale of tin executed by the Tin Sales Corp. will specify the price of the tin covered for the particular grade or quality which, unless Metals Reserve Co. sell otherwise direct, shall be the maximum price set forth in the latest price schedule issued by the Office of Price Administration. J. R. Peyrot is president of the new agency.

P-58 Amended for South American Mines

• • • Four major South American mining producers of copper and other metals, the Cerro de Pasco Copper Corp., the Andes Copper Mining Co., the Chile Exploration Co., and the Braden Copper Co., whose maintenance, repair and operating supplies are obtained under the terms of Preference Rating Order P-58, must hereafter obtain their requirements in accordance with a new procedure prescribed in the order as amended by WPB. The purpose of today's amended order is to allow scheduling of maintenance, repair, and operating materials and other machinery and equipment to the extent that South American copper producers are authorized to receive priorities assistance or allotments of material under CMP.

Non-Ferrous Prices

(Cents per lb.)

Copper Electrolytic, Conn. Valley.....	12.00
Copper Electrolytic, New York.....	11.75
Copper, Lake	12.00
Tin, Straits, New York.....	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, Virgin 99+%, delivered.....	15.00
Nickel, Electrolytic, base refinery.....	35.00
Magnesium, 99.8% ingot, per lb.....	22.50

Miscellaneous Non-Ferrous Prices

ALUMINUM, No. 12 remelt, 14.50c.; No. 2, standard, 14.50c. a lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, \$197 to \$199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 12.25c. a lb.

Blackwell Smith Quits WPB

• • • Blackwell Smith, chief of the WPB Urgency Rating Division, has resigned, effective next week. Mr. Smith will become a Lend-Lease representative in New Zealand. He has held a number of government positions since 1933 and was at one time general counsel for NRA.

Trade Notes . . .

American Brake Shoe and Foundry Co., New York, has shortened its name to American Brake Shoe Co.

Wisconsin Steel Treating Co., whose main plant and office is at 1555 S. Barclay Street, Milwaukee, has purchased a one-story heavy industrial building located at 1114 S. 42 Street.

J. I. Case Co., Racine, Wis., is remodeling one of its main works buildings at a cost of \$40,000.

E. J. Perry Machinery Corp. is now located

at Jefferson and Lawton Streets, Fall River, Mass.

Circle Tip Tool Co., Inc., 65 Colden Street, Newark, N. J., has changed its name to Tungsten Alloy Mfg. Co. All executives and personnel remain the same.

Robins Conveying Belt Co., Passaic, N. J., has shortened its name to Robins Conveyors, Inc.

Cement Tile Corp., 608 South Dearborn Street, Chicago, has been formed to manufacture and install precast concrete roof and floor slabs.

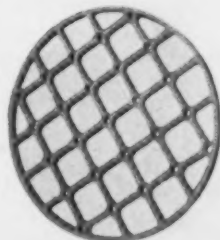
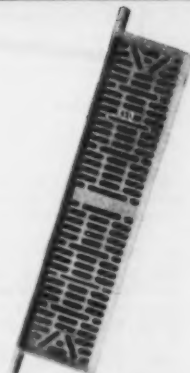


Official U. S. Navy Photograph

For the Engines of Our Naval Craft

Michiana Trays and Fixtures Used in Heat-Treating Vital Parts

• The speed and power of the U. S. PT Boats give these fighters their advantages on offense and defense . . . Reliability of their engines hinges on the dependable performance of every part, and MICHIANA well recognizes its responsibility in the production of the heat-resistant alloy furnace trays and fixtures used in the heat-treatment of vital parts of the famous Packard motors that power these craft. MICHIANA PRODUCTS CORPORATION, Michigan City, Ind.



MICHIANA
Heat-Resistant and
Corrosion-Resistant
ALLOY CASTINGS

SCRAP

... Market Activities and Prices

Scrap Stocks Fluctuate Only 1 to 2 %

• • • Domestic stocks of iron and steel scrap at consumers', suppliers', and producers' plants at the end of February, 1943, approximated 6,871,000 gross tons, representing a very slight decrease from the 6,877,000 tons

reported on January 31, 1943, according to a statement released by the Bureau of Mines.

This decline was occasioned by a decrease of less than 1 per cent in stocks held by consumers, despite an

increase in suppliers' and producers' stocks amounting to 1 per cent. Thus, while consumers' stocks on February 28, 1943, amounted to 5,544,000 tons, compared with 5,565,000 tons at the end of January, suppliers' and producers' stocks were 1,327,000 tons and 1,312,000 tons, respectively.

The majority of the decrease in total stocks was contributed by a decrease of 2 per cent in stocks of purchased scrap at consumers' plants, while dealers' stocks declined less than 1 per cent.

• • • Merrill Stubbs, former chief of the WPB Scrap Processors Branch, has been appointed chief of the Industrial Salvage Branch, succeeding Hamilton W. Wright, who resigned last week. Thomas W. Dunn, former deputy to Mr. Stubbs, was appointed chief of the Scrap Processors Branch.

• • • The Auto Wreckers Industry Advisory Committee, meeting for the first time last week, heard Paul C. Cabot, Director of the WPB Salvage Division, praise the industry for moving 3,750,000 net tons of scrap iron and steel during 1942. Mr. Cabot told the group "the most impressive part of your operations has been the fact that you have worked under the most extreme difficulties. You have surmounted problems of labor, machinery procurement, transportation, wages, and the like in a most encouraging manner."

• • • The Institute of Scrap Iron & Steel, Inc., has called a special meeting of its Industrial Relations committee at Hotel Statler, Cleveland, April 29, to consider the labor situation in the scrap industry.

The meeting will be addressed by Edwin C. Barringer, president of the Institute; Milton K. Mahler, Detroit, chairman of the Industrial Relations committee; Robert Carr, representative of the scrap processors branch of the salvage division of the War Production Board; Julian C. Hammack, general counsel of the Institute; and others.

A special meeting of the Bundlers' committee of the Institute, of which Abe Byer, of Cincinnati, is chairman, will also be held in Cleveland, April 29, at the Hotel Statler.

Wyandotte M.K.3W

This special Wyandotte solvent cleaner is giving exceptional results in cleaning prior to Parco-Lubrizing. If this important processing operation is in your production line write us for full particulars.

Wyandotte M.K.3W requires no special equipment. It is a safe and economical liquid cleaning compound to use.

There is a specialized Wyandotte Cleaner for every war production metal cleaning job.

Wyandotte Service men will be glad to consult with you on any cleaning problem.



Service Representatives in 88 Cities

WYANDOTTE CHEMICALS CORPORATION

J. B. Ford Division, Wyandotte, Michigan

★ Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.

SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				Low Ph.s.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Bk. Shrs. No. 1 & 2 Busheling	Unbale* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crank-shafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. Electric First Cut Bundles	
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	\$20.00	\$15.00	\$15.00	\$16.00	\$17.00	\$17.50	\$25.00	\$22.50	\$21.50	\$22.00	\$22.50	\$21.50	\$22.00	\$21.00	\$18.00	\$19.50	\$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburgh, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minneapolis, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.50	15.00	12.50	14.00	15.50

* Baled turnings are \$5 per gross ton higher.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles. No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburgh, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minneapolis, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing

point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their planes. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP

Scrap Rails

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	\$18.00	\$19.00	\$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

... Comparison of Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Cents Per Lb.)				
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Dollars Per Base Box)				
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic...	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Dollars Per Gross Ton)				
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Dollars Per Gross Ton)				
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 126 to 128.

Pig Iron:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Per Gross Ton)				
No. 2 fdy., Philadelphia...	\$25.89	\$25.89	\$25.89	\$25.89
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.68
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.39
Basic, Valley furnace...	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago...	31.34	31.34	31.34	31.34
Ferromanganese†	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Per Net Ton at Oven)				
Furnace coke, prompt...	\$6.50	\$6.50	\$6.50	\$6.00
Foundry coke, prompt...	7.375	7.375	6.875	6.875

Non-Ferrous Metals:	Apr. 27, 1943	Apr. 20, 1943	Mar. 30, 1943	Apr. 28, 1942
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Composite Prices . . .

FINISHED STEEL	
Apr. 27, 1943	2.25513c. a Lb.....
One week ago	2.25513c. a Lb.....
One month ago	2.25513c. a Lb.....
One year ago	2.26190c. a Lb.....

	HIGH	LOW
1943.....	2.25513c.,	2.25513c.,
1942.....	2.26190c.,	2.26190c.,
1941.....	2.43078c.,	2.43078c.,
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16
1939.....	2.35367c., Jan. 3	2.26689c., May 16
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2
1933.....	1.95578c., Oct. 3	1.75836c., May 2
1932.....	1.89196c., July 5	1.83901c., Mar. 1
1931.....	1.99626c., Jan. 13	1.86586c., Dec. 29
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9
1929.....	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON	
.....23.61 a Gross Ton.....	
.....23.61 a Gross Ton.....	
.....23.61 a Gross Ton.....	
.....23.61 a Gross Ton.....	

	HIGH	LOW
.....	\$23.61	\$23.61
.....	23.61	23.61
23.61, Mar. 20	\$23.45, Jan. 2	
23.45, Dec. 23	22.61, Jan. 2	
22.61, Sept. 19	20.61, Sept. 12	
23.25, June 21	19.61, July 6	
23.25, Mar. 9	20.25, Feb. 16	
19.74, Nov. 24	18.73, Aug. 11	
18.84, Nov. 5	17.83, May 14	
17.90, May 1	16.90, Jan. 27	
16.90, Dec. 5	13.56, Jan. 3	
14.81, Jan. 5	13.56, Dec. 6	
15.90, Jan. 6	14.79, Dec. 15	
18.21, Jan. 7	15.90, Dec. 16	
18.71, May 14	18.21, Dec. 17	

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL	
.....\$19.17 a Gross Ton.....	
.....\$19.17 a Gross Ton.....	
.....\$19.17 a Gross Ton.....	
.....\$19.17 a Gross Ton.....	

	HIGH	LOW
.....	\$19.17	\$19.17
.....	19.17	19.17
\$22.00, Jan. 7	\$19.17, Apr. 10	
21.83, Dec. 30	16.04, Apr. 9	
22.50, Oct. 3	14.08, May 16	
15.00, Nov. 22	11.00, June 7	
21.92, Mar. 30	12.67, June 9	
17.75, Dec. 21	12.67, June 9	
13.42, Dec. 10	10.33, Apr. 29	
13.00, Mar. 13	9.50, Sept. 25	
12.25, Aug. 8	6.75, Jan. 3	
8.50, Jan. 12	6.43, July 5	
11.33, Jan. 6	8.50, Dec. 29	
15.00, Feb. 18	11.25, Dec. 9	
17.58, Jan. 29	14.08, Dec. 3	

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

ces

Apr. 28,
1942
\$25.89
24.00
24.68
20.38
24.00
25.39
23.50
24.00
24.00
31.34
120.00

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\$20.00
18.75
18.75
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23.00
20.00
20.00
20.00

\$6.00
6.875

12.00
12.00
52.00
8.25
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15.00
35.00
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THE IRON AGE
Simplified
CMP and PRIORITIES
GUIDE
Section

Section 2
THE IRON AGE
April 29, 1943

THE IRON AGE
100 E. 42nd St.
New York, N.Y.
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Corrected to April 25, 1943

Basic CMP Procedure

How to Get Steel Copper or Aluminum from a Mill

I. File a properly supported application for allotment on either CMP-4A or 4B with claimant agency or appropriate WPB industry division.

II. Pursuant to authority granted by returned approved allotment, file purchase order with the mill.

The order must be:

1. Sufficiently detailed for direct scheduling by mill.
2. *Marked with an abbreviated allotment number or symbol, and showing certification.
3. Filed the required number of days in advance of the months in which delivery is desired.
4. Filed with designated mill, or if no mill

is designated by WPB, with any mill that can accommodate the order.

5. *For no greater amount nor for any earlier delivery than required to fill authorized production schedule.
6. *For no amount which would cause excessive inventory.
7. *For no more than 1/3 of material per month of a quarter's allotment, except if by so doing order would be less than minimum mill quantity.

*These steps must be followed in every purchasing procedure. See titles: Allotment Number, Certification, Orders, Inventory, in CMP Simplifier.

Obtaining From a Warehouse

Steel

I. Pursuant to authority granted by returned approved allotment, file purchase order with a warehouse.

The order must be:

1. For less than 20 net tons for any single order placed by one person at one time for delivery to one place, except if:
2. For more than 20 tons, order must be composed of at least 10 items of not more than 4 net tons each—all items being of different quality or size. (Tonnage limitation does not apply to oil country tubing, casing or drill pipe.)

II. Pursuant to other or no WPB authorization, file purchase order with a warehouse.

The order may be honored if:

1. For \$10 worth or less in amount, and shows no preference rating, allotment number, or symbol.
2. It bears a preference rating of AA-5 or higher, and is placed before July 1.
3. It is an order for carbon steel authorized under Food Production Order No. 3 of the Secretary of Agriculture.
4. It is placed for delivery of not more than the amounts of each product classification and type indicated by the chart on page 1, CMP, Reg. 4. (See heading LISTS in CMP Simplifier.

Copper

I. Pursuant to authority granted by returned approved allotment, file purchase order with a warehouse.

The order must be:

1. *For no more than 500 lb. for delivery of any one item to one destination.
2. For no amount to make total orders for a month exceed 2000 lb. per item.

*The 500 lb. limitation does not apply to brass mill products such as condenser tubes, a single straight length of rod, tube, pipe, sheet or strip; the limitation does not apply to wire mill products such as wire and cable 4/0 and larger in full reels not exceeding 1000 ft. each.

II. Pursuant to an order bearing an AA-5 or higher rating, purchase order may be filed with warehouse prior to July 1.

Aluminum

I. Pursuant to authority granted by returned approved allotment, file purchase order with warehouse.

The order must be:

1. For no more than 500 lb. of any gage, alloy and size of aluminum sheet. *(2000 lb. maximum.)
2. For no more than 300 lb. of any alloy, shape and size of aluminum wire, rod or bar. *(1000 lb. maximum.)
3. For no more than 200 lb. of any alloy, size, and shape of aluminum tubing, extrusions, or structural shapes. *(500 lb. maximum.)

*Maximum quantities which may be filled at the election of the warehouse after request to fill the order has been made to a mill, the mill directs warehouse to fill order from warehouse stocks.

Obtaining Class A and B Products

I. Obtaining Class A products by use of an allotment number or symbol.

1. Manufacturer makes an allotment of the necessary quantity of materials to his own plant to produce the required Class A product.
2. Class A products for maintenance, repair and operating supplies. (See this title.)
3. Class A products requiring small amounts of controlled material. (See small order procedure.)

4. Class A products which are Class Y critical components. (See this outline.)

II. Obtaining Class A products without an allotment number or symbol.

1. A Class A product is never purchased to be incorporated into another product without using an allotment number or symbol except when the Class A product is purchased from a distributor.

III. Purchasing for resale.

1. A manufacturer who buys Class A prod-

ucts for resale in an amount not exceeding 10 per cent obtains the same as follows:

2. Includes the controlled materials required for resale products in the allotment application he makes for his production materials just as though he would manufacture the resale items himself.

I. Obtaining Class B products by use of CMP rating. (NOTE: Class B products are never obtained by making an allotment of controlled material for them.)

1. Places purchase order including preference rating, allotment number or symbol, and the certification provided in CMP Reg. 3, or the alternate certification in CMP Reg. 7, except:

2. If the Class B product is a Class critical component, purchase order can be placed only as provided in General Scheduling Order M-298. (See this outline.)

II. By use of a preference rating.

1. Places purchase order including authorized preference rating and the certification provided in Priorities Reg. 3.

III. Without the use of a preference rating.

1. Places purchase order with the Class product manufacturer, requesting him to fill the order if possible and if not to hold the same pending its validation by a preference rating or a CMP rating.

IV. Purchase for resale.

1. The manufacturer who buys Class products for resale in an amount not exceeding 10 per cent of his total sales obtains the same just as though such products were production materials incorporated in his product.

V. Obtaining other materials.

1. Manufacturer uses whatever purchase authority he is entitled to use, considering the material required and the activity involved.
2. Preference rating with allotment number or symbol.
3. Any procedure required in any E, L, M or P order.
4. Ordinary purchase order if no preference rating or procedure is required.

Critical Components

I. CMP procedure as applied to critical components.

1. Manufacturers of components not Class X or Class Y (least critical) files specified form indicated in column 1 of schedule attached to Order M-293 with WPB. The forms of operation report most frequently required are PD-900 and PD-902. Reports should be filed on the dates specified in the applicable form.

Class X Components

2. On Class X components which are more critical, a manufacturer files a specified form indicated in column 1 of schedule attached to M-293 with WPB.

Reports of delivery schedules

4. On reports of delivery schedules, a manufacturer files form specified in column 1 of schedule attached to order M-293. The form most frequently required is PD-901. Report will include detailed proposed delivery schedule of Class X components.

Limitations on manufacturers

4. After May 1, 1943, manufacturers may make delivery of Class X components only in accordance with WPB approved schedules regardless of preference rat-

ings or allotment numbers which other orders may bear, and notwithstanding any other WPB orders or regulations.

Class Y components

Class Y components operation reports are indicated as to the form required in column 1 of schedule attached to M-293, with WPB. The form most frequently required is PD-901. Report will include detailed proposed delivery schedule of Class Y components.

Limitations on manufacturers

6. Manufacturers must accept orders for any Class Y component if he has received WPB authorization. Any accepted order must be scheduled by the manufacturer with whom it is placed, provided regular price and terms are met. Once having scheduled an order, the manufacturer will make delivery in accordance with the schedule regardless of preference ratings or allotment numbers, of other orders, and notwithstanding any other WPB order or regulation.

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Component Purchasing Procedure

Reports and communications.

1. The listing of any product as a critical component in M-293 does not relieve the manufacturer of the product from complying with any other WPB order.

2. All reports and forms required by M-293, and all communications with respect to critical components should be addressed to WPB, Washington, D. C., attention of the appropriate industry division.

Purchasing a critical component.

1. When a critical component is not Class Y, the customer follows normal CMP procedure.

2. When the critical component is Class Y, customer files specified form indicated in column 3 of schedule attached to M-293 with WPB. If the application form is returned with WPB approval, purchaser includes it with his purchase order which must be in accordance with usual CMP procedure.

III. Obtaining maintenance repair and operating supplies. Procedure for manufacturers of products listed in schedules I and II of CMP Regulation No. 5. MRO includes minor capital equipment not exceeding \$500 (ex-

cluding labor cost) provided larger items are not subdivided to bring them within the \$500 limitation. Items in List A of CMP Regulation No. 5 may not be obtained by this MRO procedure even though in fact they may constitute maintenance, repair or operating supplies.

1. Places symbol "MRO" on purchase order to mill or warehouse.

2. If covered by order in "P" series, places "P" number on purchase order.

3. Orders for controlled materials for one quarter must not exceed in the aggregate one-fourth of the amount used in the calendar or fiscal year, 1942. For a seasonal business, MRO purchases must not exceed those of the corresponding quarter of the base year. Delivery of purchases must not result in inventory exceeding either a practical working minimum, or the 60-day inventory provided in CMP Regulation 2.

4. Endorses or accompanies purchase order with the MRO certification in CMP Regulation 5, Paragraph (c) (1), or that alternate certification provided in CMP Reg. 7.

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Small Order Procedure

"Small Orders" for Class A products.

1. This procedure is used only to obtain a small order without making an allotment.

2. By persons who are entitled to make an allotment for them.

3. A "small order" is a purchase order for a Class A product where the aggregate amounts of controlled material required to fill the order together with all delivery orders for the same Class A product placed by the same customer with the same manufacturer calling for delivery during the same month do not exceed the following quantities:

Carbon steel (including wrought iron)	1 ton
Alloy steel	400 lb.
Copper and copper base alloys	100 lb.
Aluminum	20 lb.

Manufacturers purchasing Class A products by Small Order Procedure.

1. Places order on the manufacturer of the Class A product, including:

a. Appropriate preference rating.

b. Abbreviated allotment number followed by symbol "SO".

c. Certification provided in CMP Regulation 3, paragraph (g) or the alternate

certification provided in CMP Regulation 7.

2. Such purchases are subject to the following restrictions:

a. Requirements for Class A products cannot be subdivided so to make orders small enough to come under this provision.

b. If the total of controlled materials in the small order purchases of a manufacturer, plus the controlled materials secured by him without an allotment for production, exceed 25 per cent of the materials allotted for his entire production during a period, or a minimum mill quantity, he must reduce his allotment by such amount.

III. Manufacturers of Class A products receiving SO orders.

1. To obtain production materials, controlled materials:

2. Place purchase order including Symbol SO followed by number of the month in which delivery is required.

3. Certification as provided in CMP Regulation I paragraph (a) (3) or the alternate certification provided in CMP Regulation 7.

Agencies & Symbols

Symbol

W—War Department except Ordnance marked (O).

N—Navy Department.

M—Maritime Commission.

C—Aircraft Resources Control Office.

L—Lend-Lease Administration.

E—Board of Economic Warfare.

S—Office of Civilian Supply.

A—Department of Agriculture.

T—Office of Defense Transportation.

R—Office of Rubber Director.

F—Facilities Bureau of WPB.

P—Petroleum Administration for War.

H—National Housing Agency.

U—Office of War Utilities Director.

D—Canadian programs (not a Claimant Agency).

4. Other than controlled materials, manufacturer places order including:

5. Symbol SO.

6. Appropriate preference rating, and certification.

7. If by grouping his small orders to purchase Class A components, a manufacturer exceeds the small order quantities, he should advise his supplier that he has covering SO purchase orders entitling him to buy more than the maximum quantities set forth in the small order procedure.

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MRO Supplies

I. Procedure for manufacturers of products not listed in Schedules I and II of CMP Regulation 5.

1. Manufacturer applies for allotment of controlled materials on the appropriate form, in view of the materials required, and their regulations pertaining to his business. If no form is specified, he uses a PD-1A or PD-25F, addressing it to the Regional Office for amounts under \$500, or the WPB, Washington, D. C., for amounts over \$500.

2. Attaches detailed letter explaining need for MRO materials.

3. If application is approved, places purchase order in accordance with the assistance granted.

II. To obtain other than controlled materials (whether Class A or Class B, or other products or materials).

1. Places preference rating A-10 and symbol MRO on purchase order.

2. Endorses or accompanies purchase order with the certification CMP Regulation 5, paragraph (d) (2) or the alternate certification provided in CMP Regulation 7.

III. Miscellaneous.

1. Manufacturers requiring MRO in quantities available from warehouses, or at retail without preference ratings or allotments, may obtain the same without using this procedure, but subject to all WPB orders.

2. If a manufacturer needs additional assistance in getting adequate MRO, he may apply on appropriate form according to the materials required and the regulations pertaining to his business. If none is specified, a PD-1A or PD-25F should be used with a letter stating why assistance is needed, addressing it to the Regional Office for amounts under \$500, or the WPB, Washington, D. C., for amounts over \$500.

The CMP Simplifier

• • • Arranged like a dictionary, these brief synopses of various phases of CMP have been prepared so that by referring to the desired topic, a brief but complete explanation of the required steps in proper CMP procedure are outlined. For instance, by referring to

"allotments" the complete method for obtaining allotments will be found presented in proper succession. The CMP Simplifier had never before been attempted until THE IRON AGE developed this ready reference with simplified text.

1 Allotments

Advance. Advance allotments by Claimant Agencies or Industry Divisions to prime consumers may be made within specified limits before receipt of allotments from the Requirements Committee to assure fulfillment of long term programs and schedules. Prime consumers receiving such advance allotments may make allotments to their secondary consumers. Secondary consumers may make further allotments, but no consumer shall make any allotment in advance of receiving his own. (Reg. 1 (c) (4))

Assignment. No consumer shall transfer or assign any allotment in any way unless:

(1) Orders placed with him, in connection with which the allotment was made to him, have been transferred or assigned to another consumer;

(2) The authorized production schedules of the respective consumers have been duly adjusted; and

(3) The transfer or assignment is approved in writing by the person who made the allotment. (Reg. 1 (j))

Class A products. Each Claimant Agency will distribute the allotments received by re-allotting to prime consumers who make Class A products for it. Quarterly re-allotments will designate the amount and form of controlled materials available to a prime consumer for use by the prime consumer or for further allotment to secondaries producing Class A products as parts or sub-assemblies for it. A prime producing Class A products for several Claimant Agencies shall obtain separate allotments from each. A Claimant Agency may, in particular cases, make allotments through an Industry Division. (Reg. 1 (c) (2))

Class B products. Unless otherwise directed, allotments to producers of Class B products will be made only by Industry Divisions. This rule applies both to Class B products which are end products and to Class B products which are incorporated in other products whether Class A or Class B. Allotments made by the Requirements Committee may be made available to the Industry Divisions by the Claimant Agencies. Industry Divisions will make allotments to the prime consumers producing Class B products under their jurisdiction. Quarterly allotments will designate the amount of the forms of controlled material available to each prime consumer, for use by it or allotment to secondary consumers producing Class A products for it. A manufacturer of several Class B products coming under the jurisdiction of different Industry Divisions shall obtain separate allotments from each. A consumer producing Class B products is always a prime consumer with respect to such production. (Reg. 1 (c) (3))

Grouping. A consumer operating under several authorized production schedules may

combine in a single allotment to a secondary consumer requirements for any number of different production schedules which are identified by the same major program number, and he may authorize a single production schedule for the secondary consumer in connection with the allotment. If the secondary consumer has filed separate applications and the consumer making the allotment acts on the applications separately, the secondary consumer may nevertheless treat the allotments and authorized production schedules bearing the same major program number as a single allotment and a single authorized production schedule (Reg. 1 (h))

Methods. A consumer may make an allotment to his secondary consumer by either:

Executing and returning one of the copies of the application (Form CMP-4A, or such other form as may be prescribed) or, in the event an application has been waived, by indicating on the prescribed application form the controlled materials allotted and executing and delivering such form to the secondary consumer;

Placing on or affixing to his purchase order for one or more Class A products the short form of allotment (Form CMP-5) set out in Schedule II attached; or

Telegraphing the information required confirming the same with the appropriate written form. (Reg. 1 (h) (1))

Every consumer shall place on allotments made by him the allotment number received by him, except that if the full allotment number is on the allotment received by him, he need only place on related allotments made by him the abbreviated allotment number. If a consumer places a purchase order for which he has made an allotment by separate instrument, he shall place the appropriate number on the order. (Reg. 1 (h) (2))

Consumer-to-consumer. A prime consumer receiving an allotment may use that portion of the allotment he requires to obtain controlled materials for his authorized production schedule, and shall allot the rest to his secondary consumers producing Class A products for him, to cover their requirements. Allotments by secondaries to secondaries supplying them may be made in the same fashion. A secondary consumer producing Class A products for several other consumers shall obtain separate allotments from each. (Reg. 1 (c) (4))

No consumer shall make an allotment which exceeds the related allotment received by him, after deducting all other allotments made by him and all orders for controlled materials placed by him pursuant to his related allotment. (Reg. 1 (g) (1))

No consumer shall make any allotment for the production of Class B products and no person shall accept any allotment from a consumer for the production of Class B products. (Reg. 1 (g) (3))

No consumer who has received his allotment for an authorized production schedule shall place any delivery order, other than small orders for a Class A product required to

fulfill the schedule, unless concurrently prior thereto, he makes an allotment to person with whom the order is placed, in amount required by such person to fill order in view of inventory restrictions; provided, however, that if he purchases a Class product from a distributor he need make allotment but must charge his own allotment. (Reg. 1 (g) (4))

Forms of. Each allotment by whomsoever made shall specify the form of the controlled material allotted. Allotments of steel shall be in terms of (1) Carbon steel (including wrought iron) and (2) alloy steel, with further breakdown. Allotments of copper or aluminum shall be broken down as indicated in Schedule 1. A consumer may make allotments only in the same forms of controlled materials in which he has received his allotment. (Reg. 1 (f))

Identifying. Allotments to prime consumers shall be identified by allotment numbers consisting of a Claimant Agency letter symbol and nine digits. The first digit identifies the program of the Claimant Agency. The next three digits identify the production schedule of the prime consumer. The last two digits indicate the quarter in which the allotment is valid. Months are numbered consecutively beginning with January 1942. Each quarter will be identified by the first month in the quarter. Thus 16 will denote the second quarter of 1943, 19 will denote the third quarter, etc. Thus, 16, 17, 18 will denote the second quarter of 1943, 19, 20, or 21 will denote the third quarter of 1943. Orders placed by consumers with controlled materials producers are to be identified by month number instead of quarterly number as provided in paragraph S (3) of Reg. 1.

Allotments to secondary consumers shall be identified by an abbreviated allotment number consisting only of a major program identification and the quarterly identification number. The major program identification shall consist of the Claimant Agency letter symbol followed by the first digit only of the program number (omitting the last three digits of the program number and the entire schedule number). For example, in the case of an allotment to a prime consumer, designated W-2345-687, the allotment to a secondary consumer will simply W-2-16 denoting an allotment for major program number 2 of the War Department for delivery of controlled materials the second quarter of 1943. (Reg. 1 (c) (4))

Material deductions. Each consumer shall promptly reduce, in the manner provided, the allotment received by him, to the extent he either before or after receiving the allotment he fills a substantial portion of any of his requirements covered by the allotment through the acquisition of controlled materials or Class A products in any other manner than by use of the allotment including without limitation:

(1) Transactions covered by preference ratings (2) Transactions not affected by preference ratings:

(5) Purchases from warehouses or retailers pursuant to CMP Regulation No. 4 or otherwise;

(4) Purchases pursuant to Priorities Regulation No. 13 or otherwise, from persons not regularly engaged in the business of selling material or product;

(5) Purchases on small orders.

(6) Purchases of second-hand materials or products.

"Substantial portion" of requirements covered by an allotment shall mean an amount of controlled materials which is either in excess of 25 per cent of the material allotted or greater than the minimum mill quantity of such material specified in Schedule IV attached. (Reg. 1 (v))

If a consumer's requirements for controlled materials or Class A products are increased after he receives his allotment, he should apply for an additional allotment from the person who made the same. If his requirements increase, for any reason, he shall promptly reduce (include) or reduce his allotment in the manner provided in paragraph (i) of this regulation. (Reg. 1 (w))

WFO Supplies. (1) A distributor of Class A products who receives delivery thereof may, unless otherwise ordered, buy and sell them without making or receiving allotments. A prime manufacturer of Class A products selling them directly or indirectly to distributors may obtain an allotment for such manufacturer from the appropriate Industry Division pursuant to the Claim application on Form CMP-4B in the same manner as if they were Class B products. If delivery is made directly by the manufacturer to a distributor's customer, the latter (unless the distributor is also a distributor) shall make an allotment directly to the manufacturer.

(2) A manufacturer of Class A products who sells them for use as maintenance, repair or operating supplies (except items directly purchased and programmed by a Claimant Agency) shall, unless otherwise ordered, obtain allotments for such manufacture for delivery to distributors. Applications may be combined in a single application on Form CMP-4B.

(3) A manufacturer who also sells, purchased Class A products to round out his line, which do not represent more than 10 per cent of his total sales, shall be deemed the manufacturer of such products and not a distributor. (Reg. 1 (k) (1))

Order treatment. (1) Each mill shall comply with such production directives as may be issued from time to time by the appropriate Controlled Materials Division.

(2) A mill shall accept authorized controlled material orders in the order in which received by him except:

It may reject orders for less than the minimum mill quantities specified in Schedule IV, but shall not discriminate between consumers in rejecting or accepting such orders. In any case where it is of the opinion that the filling of the order would substantially reduce over-all production owing to the large size of the order, unusual specifications, or otherwise, it shall apply to the appropriate Controlled Materials Division which may direct that the order be placed with another supplier or take other appropriate action.

The mill shall refuse any order for shipment of any product in any month if the order,

together with all authorized controlled material orders already on hand for delivery during that month and any orders carried over from the preceding month, plus such amounts as the mill may be directed by the Controlled Materials Division to deliver or set aside for delivery to warehouses or non-integrated mills or otherwise, total 110 per cent of the production of such product specified in his production directive. If no production directive is currently in effect with respect for such product, total 105 per cent of his expected production. As soon as such limits of 110 per cent and 105 per cent respectively have been reached, each controlled materials producer shall promptly notify the appropriate Controlled Division in writing. (Reg. 1 (m) (n) (o))

The mill shall reject orders to the extent required by specific direction of the Controlled Materials Division.

(3) No mill shall, after March 31, 1943, make any delivery of controlled material except:

A delivery made to fill an authorized controlled material order;

A delivery which is completed before July 1, 1943, and which is made in compliance with applicable priorities regulations and orders;

A delivery made pursuant to a specific direction of the Director of the Controlled Materials Division.

A controlled materials producer's use of controlled material produced by him (except use in processing which does not convert the same into any form or shape other than one specified with respect to such controlled material on Schedule I) shall be deemed a delivery.

(4) A mill shall make delivery on each authorized controlled material order as close to the requested delivery rate as is practicable in view of the need for maximum production and compliance with production schedules. If it is not practicable to make delivery during the month requested, delivery may be made:

After the 15th of the preceding month, provided such delivery does not interfere with delivery on authorized controlled material orders designating shipment in such preceding month or earlier months, and provided production to meet such delivery would not violate any production directive in effect; or

As early as practicable in the month following the month requested: Provided that, in such case, the controlled materials producer shall promptly notify the customer of such delay. If such delay will interfere with the customer's authorized production schedule, the customer should immediately apply to the appropriate Controlled Materials Division for relief.

(5) If, after accepting an authorized controlled material order, the producer cannot make delivery before the end of the month following the month in which delivery is requested, he shall promptly notify the appropriate Controlled Materials Division in writing stating the allotment number, the name of the customer and the material covered by the order, but he shall not thereafter fill the order unless specifically directed to do so.

(6) All directions to mills affecting production and distribution of controlled materials shall be issued by and through the Controlled Materials Divisions.

(7) If the controlled material delivered pursuant to an authorized controlled material order varies from the exact amount specified in the authorized controlled material order, the making and acceptance of such delivery

shall not be deemed a violation of this regulation or any other CMP Regulation by the controlled materials producer or his customer, provided such variation does not exceed the commercially recognized shipping tolerance, or allowance for excess or shortage.

(8) An authorized controlled material order shall not constitute an allotment of controlled material to the controlled materials producer with whom it is placed. If such producer requires delivery after March 31, 1943, of controlled materials from other controlled materials producers, to be processed by him and sold to his customers in another form or shape constituting a controlled material, such delivery may be made or accepted only pursuant to a specific direction. (Reg. 1 (t))

Production Schedules. Every allotment made by a consumer must include or be accompanied by authorization of a production schedule with respect to the products to be supplied to him. No consumer shall authorize a production schedule for a secondary consumer unless he concurrently allots the controlled materials required to fulfill the schedule. Provided, that the foregoing shall not apply to any delivery order bearing a SO symbol which may be placed without making an allotment as expressly permitted by a regulation or order of the WPB.

A production schedule for each prime consumer producing a Class A product shall be authorized by the appropriate Claimant Agency on Form CMP-4A, or such other form as may be prescribed. A Claimant Agency may authorize a production schedule through an Industry Division.

A production schedule for each secondary consumer producing a Class A product shall be authorized by the consumer for whom such Class A product is to be produced, on the form on which the related allotment is made. Provided that the delivery date specified on a purchase order shall constitute an authorization of the minimum production schedule required to permit delivery on such date.

A production schedule for each consumer producing a Class B product shall be authorized by the appropriate Industry Division (or in special cases by a Claimant Agency) on Form CMP-4B, or such other form as may be prescribed.

A consumer receiving allotments from several persons shall obtain separate authorized production schedules for each.

Prior to authorizing a production schedule, a Claimant Agency, Industry Division or consumer may furnish a tentative production schedule to be used as a basis in submitting requirements, but the action shall not constitute authorization of a schedule.

Each consumer receiving an authorized production schedule shall fulfill it unless prevented by circumstances beyond his control. A manufacturer of Class B products need not produce more than required to fill orders bearing preference ratings.

No consumer who has received an authorized production schedule shall exceed such schedule in any month, except that a deficiency in meeting an authorized production schedule during any month may be made up in any subsequent month or months. Production authorized for any month may be completed at any time after the 15th of the preceding month. Where an order calls for deliveries, in successive months, of Class A products in quantities which are less than the minimum practicable production quantity,

and compliance with monthly production schedules would result in substantial interruption of production and consequent interference with production to fill other delivery orders, the consumer may produce in the first month the minimum practicable quantity which may be made without interference. A person shall be deemed to exceed an authorized production schedule if his completion of finished products exceeds the limits authorized, or if his rate of fabricating, assembling, or processing, or acquiring raw materials or parts, exceeds the practicable working minimum required to meet the authorized production schedule.

Where a Claimant Agency authorizes a production schedule permitting production of a Class A product in a quantity different from the quantity called for in the related contract between the Claimant Agency and the prime consumer, the lesser of the two quantities shall govern, but the appropriate officer of the Claimant Agency should be promptly notified. (Reg. 1 (m) (n) (o))

Purchase Orders. (2) A consumer who has received an allotment may place an authorized controlled material order with any mill, unless otherwise specifically directed. An allotment to a prime consumer may designate the mill to furnish the controlled materials. In this event the consumer shall use the allotment only to obtain controlled materials from the designated mill or to make allotments to secondary consumers, designating therein only producers named in the allotment received by him. Except as required by the allotment which he has received, no consumer shall impose any such restriction in any allotment made by him.

(3) Every authorized controlled material order must be identified by an endorsement including an allotment number or symbol. Unless another form of endorsement is specifically prescribed by an applicable order or regulation of the WPB. See certification.

(4) A purchase order for controlled material must be in sufficient detail to permit entry on mill schedules and must be received by the controlled materials producer at such time in advance as is specified in Schedule III, or at such later time as the controlled materials producer may find it practicable to accept the same, provided that no controlled materials producer shall discriminate between customers in rejecting or accepting late orders.

(5) Controlled materials required for fulfillment of a production schedule which has not yet been authorized may be ordered for delivery before July 1, 1943, under applicable priorities regulations and orders without placing an authorized controlled material order. Authorized controlled material orders shall, however, take precedence over other orders to the extent provided in CMP Reg. No. 3 regarding preference ratings.

(6) A purchase order placed by a consumer before he has received his allotment and authorized production schedule may be converted into an authorized controlled material order either by furnishing a copy of the order conforming to the requirements of this regulation or by furnishing in writing the requisite information clearly identifying the order and bearing the proper certification.

In order to prevent congestion of orders calling for delivery of controlled materials in the early portions of each quarter, no consumer shall place authorized controlled material orders requesting delivery of the material either in the first month of any quarter

in an amount exceeding one-third of the aggregate amount of controlled material for which he has received allotments for the quarter as of the time of placing his order, or in the first two months of any quarter in an amount exceeding two-thirds of such aggregate. Provided, that, in the case of aluminum, during the second quarter of 1943, the limitations shall be 30 per cent for the first month and 63 per cent for the first two months. No consumer shall be required to reduce a purchase order below the minimum mill quantity specified in Schedule IV. In no event, shall a consumer request delivery in a greater amount or on an earlier date than required to fill his authorized production schedule, or in an amount so large or on a date so early that receipt of the amount on the requested date would result in his having an excessive inventory. (Reg. 1 (s) (1))

Restrictions. (1) No consumer shall use an allotment, or any controlled material or Class A product obtained pursuant to an allotment for any purpose except:

To fulfill the authorized production schedule for which the allotment was received or to fulfill any other authorized production schedule of the same consumer, within the same plant or operating unit, which schedule is identified by the same Claimant Agency letter symbol.

For any purpose authorized or directed by the Director General for Operations, or by the appropriate Claimant Agency where only such Agency's schedules are affected or where a single Claimant Agency has been stipulated for the purpose by all Claimant Agencies whose schedules are affected; or

To restore to a practicable working minimum his inventory of such material or product if the same has been depleted in fulfilling a production schedule or such purpose, subject, however, to inventory limitations; or

As permitted or required by Priorities Regulation No. 13, pertaining to special sales, or any other applicable regulation of the WPB.

(2) No physical segregation of inventories is required, provided the restrictions applicable to any specific lot of material or product are observed with respect to an equivalent amount of the same material or product. A consumer who is operating under several authorized production schedules need not maintain separate records of the production obtained from the allotment for each schedule provided that his records show that his use of material for his respective schedules is substantially proportionate to the amounts of material allotted for each, and that his aggregate production of any product does not exceed his aggregate authorized production schedules for that product. (Reg. 1 (u))

Simultaneous allotments. A prime or secondary consumer who has several secondary consumers in different degrees of remoteness and finds it impracticable to determine the exact allotments to be made to each of his immediate secondary consumers, for their needs and those of their secondary consumers, may, at his option, make simultaneous direct allotments to each secondary consumer, of all degrees of remoteness by adopting the following procedure:

(1) The consumer who is to make the allotment called the originating consumer shall maintain a complete list of all secondary consumers making Class A products for incorporation in his product. He shall keep this list current at all times by requiring each of his immediate secondary consumers to report

promptly to him any change with respect to the source of each secondary consumer's Class A purchased products.

(2) Immediately upon receiving an allotment, the originating consumer shall notify each secondary consumer on the list of the authorized schedule for which the allotment has been made to him. Such notice shall include an allotment number. It shall identify the product to be delivered by the secondary consumer to whom the notice is sent and state the quantity to be delivered and the time when delivery is required.

(3) Promptly upon receipt of such preliminary notice, each secondary consumer shall report to the originating consumer directly the amount of each form of controlled material required by him each month to make the deliveries indicated. Each such secondary consumer shall include only his own requirements of controlled materials, not those of his secondary consumers. No form is prescribed for such statement.

(4) The originating consumer shall then determine the total requirements of all his secondary consumers under the schedule, check the list to make certain that a preliminary statement of requirements has been received from each secondary consumer.

Small orders. (1) A person requiring a Class A product in a quantity constituting "small order," as defined, and who is entitled to obtain these products by using an allotment number, may, in lieu of making an allotment place on his order the applicable allotment number followed by the symbol SO; **Provided, however,** That no person shall subdivide his requirements for Class A products into small orders for the purpose of coming within the provision.

(2) As used in this paragraph (1), "small order" means a purchase order for a Class product placed with the manufacturer thereof by a consumer, where the total of controlled material required to fill the order, together with all delivery orders for the same Class product placed by the same consumer with the same manufacturer calling for delivery during the same month, do not exceed the following:

Carbon steel (including wrought iron)	1 ton
Alloy steel	400 lbs.
Copper and copper base alloys	100 lbs.
Aluminum	20 lbs.

(3) A manufacturer of Class A product who receives small orders may obtain his requirements of controlled materials to fill them by placing authorized controlled material orders in the same manner as if he had received an allotment therefor, except that, in lieu of an allotment number, he shall use the symbol SO. Use of such symbol shall constitute representation, subject to criminal penalties, that the controlled materials ordered are required for the production of Class A products which will be delivered on small orders, or replace in inventory Class A products so delivered. If it is impracticable to keep exact accounts of the amounts of controlled materials required for small orders, a reasonable estimate may be made.

(4) No manufacturer of Class A product receiving a small order shall be required to furnish his customer with a bill of material application for allotment or equivalent information with respect thereto, other than statement, if requested, that the controlled materials required come within the limits of small order. (Reg. 1 (1))

Appeals and Applications for Relief

Appeals and applications for relief. (1) Any person who is subject to any requirement of any regulation, direction, order or other action under CMP, may appeal for relief by filing a letter in triplicate with the appropriate authority specified, setting forth the pertinent facts and the reasons why such person considers that he is entitled to relief: Except as otherwise provided an appeal by a producer of Class A products should be filed with the appropriate Claimant Agency, and an appeal by a producer of Class B products should be filed with the appropriate Industry Division, unless the matter affects only production schedules of a single Claimant Agency has been stipulated for the purpose by all Claimant Agencies whose schedules are affected, in which case the appeal should be filed with such Claimant Agency.

An appeal concerning the operations of a controlled materials producer (whether filed by such producer, by a consumer, or by a Claimant Agency) shall be filed with the appropriate Controlled Materials Division.

A producer of Class B products may apply

for permission to be treated as a producer of Class A products. A producer of Class A products making a large variety of items which are sold to many customers and whose allotments originate from several Claimant Agencies, may make application to be treated as a producer of Class B products, but such permission will not be granted with reference to component parts or subassemblies, unless the necessary adjustments in bills of materials which include such component parts or subassemblies can be made without difficulty. Application for reclassification should be filed with the CMP Division, WPB, Washington, D. C., and may be filed either directly by the producer or by a Claimant Agency on his behalf.

In case of any disagreement between any persons as to the interpretation of any provisions of this regulation or any other regulation, direction, or order under the Controlled Materials Plan, the matter should be referred to the Inquiry and Service Branch, CMP Division, WPB, Washington. (Reg. 1 (2))

Bills of Material Details

The basis for allotment shall be actual requirements for controlled materials of an authorized production schedule. The production schedule shall be authorized by WPB. Information on requirements shall be a bill of materials, an application for allotment or other information. (Reg. 1 (d) (1))

A bill of materials shows the amounts of controlled materials required by a consumer and his secondary consumers, irrespective of time of delivery and inventory, for production of a unit or a number of units of his product. Bills of materials shall be prepared on forms CMP-1, CMP-2, and CMP-3. No consumer shall be required to furnish a bill of materials on any form which is not officially prescribed. Where another form is in use which gives the same information as the official form, the Claimant Agency, Industry Division or consumer to whom a bill of materials is to be furnished may accept it on such other form. (Reg. 1 (d) (2))

An application for allotment shows the total sum of each of controlled material required, taking inventories into account, by a consumer and his secondary consumers during each month of a quarter for entire production of a product or class of products for the same customer. In the case of Class A products, it shall be shown for a customer; or for all customers, in the case of Class B products. Applications are to be made by manufacturers of Class A products on Form CMP-4A, and by manufacturers of Class B products on Form CMP-4B, or on such other forms as may be prescribed. Although allotments are to be made by quarters instead of months, applications for allotments shall show monthly requirements where required (Reg. 1 (d) (3))

A bill of materials or application for allotment shall not include controlled materials required for manufacture of Class B products to be incorporated in the product concerned. Information of the number or value of such Class B products is to be given in bills of materials to the extent required by the instructions. (Reg. 1 (d) (4))

Requirements for maintenance, repair or operating supplies shall not be included in bills of materials or applications for allotment. (Reg. 1 (d) (5))

Bills of materials shall be filed only when

and as called for by a Claimant Agency, Industry Division or other consumer. Manufacturers of Class A products shall file applications for allotments only when and as called for by the Claimant Agency or other consumer involved. Manufacturers of Class B products who require controlled materials from controlled materials producers during the second quarter of 1943 (or whose secondary consumers will require the same) must file applications for allotments on Form CMP-4B not later than Feb. 9, 1943, or by such other date as may be designated or approved. Those manufacturers of Class B products who obtain their requirements of controlled materials for the second quarter of 1943 entirely from warehouses or retailers, and whose secondary consumers do the same, need not file any applications for allotments. (Reg. 1 (d) (6))

Each person making an allotment may require other information in lieu of, or in addition to, a bill of materials or application for allotment required to enable the making of an allotment. If the consumer from whom other information is requested is of the opinion that compliance with the request would be unreasonably burdensome he may appeal for relief. (Reg. 1 (d) (7))

Any consumer making an allotment may waive the furnishing of a bill of materials or application for allotment, or both, if he has other information as to actual requirements of his secondary consumers, taking into account inventory restrictions which is sufficiently accurate and detailed to enable him to make the allotment. (Reg. 1 (d) (8))

4 Certifications

Brass or Wire Mill. The undersigned hereby certifies to the warehouse with whom this order is placed and to the WPB, subject to the criminal penalties provided in section 35 (A) of the U. S. Criminal Code, that the amount of each item of brass mill or wire mill products covered by this order, together with all other amounts of such item received by, or on order for delivery to the undersigned, at any one destination from warehouse stock, during the same month, does not exceed 2000 lbs., and that such items will not be used by the undersigned for any purpose in violation of any order of the WPB. (Reg. 4 (f))

General. Preference Rating

Allotment number or symbol The undersigned certifies, subject to the criminal penalties for misrepresentation contained in section 35 (A) of the U. S. Criminal Code, that he is authorized under CMP Regulation No. 3 to apply or extend the above preference rating and allotment number or symbol to the delivery of the items covered by the attached delivery order. (Reg. 3 (g))

General. Alternate. The undersigned purchaser certifies, subject to the penalties of section 35 (A) of the U. S. Criminal Code, to the seller and to WPB, that, to the best of his knowledge and belief, the undersigned is authorized under applicable WPB regulations or orders to place this delivery order, to receive the item(s) ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order.

If the applicable CMP Regulation requires an allotment number or symbol, preference rating or other identification to be included in a certification, such identification shall be placed on the delivery order if the above form of certification is used. (Reg. 7 (a) (b))

MRO Aluminum. The undersigned certifies, subject to the criminal penalties for misrepresentation contained in section 35 (A) of the U. S. Criminal Code, that the materials covered by this order are required for essential maintenance, repair or operating supplies, to be used for a purpose listed in Schedule I or II of CMP Reg. No. 5; that the use of other materials for such purpose is impracticable; and that the amount of aluminum covered by this order, together with all other amounts received by, or on order for delivery to the undersigned, from all sources, for such purposes during the same quarter, will not exceed 100 lbs. (Reg. 5 c (2))

MRO, Copper, Steel. Any person engaged in the business of producing any product or conducting any business listed in Schedule MRO I or MRO II, requiring delivery after March 31, 1943, of any controlled material, except aluminum, for maintenance, repair or operating supplies in the conduct of such business, may obtain the same by placing on his order the proper certification, signed manually or as provided in Pri. Reg. 7; CMP Allotment symbol MRO—(P order No.)—The undersigned certifies, subject to the criminal penalties for misrepresentation contained in section 35 (A) of the U. S. Criminal Code, that the controlled materials covered by this order are required for essential maintenance, repair or operating supplies, to be used for a purpose listed in Schedule I or Schedule II of CMP Regulation No. 5 and that delivery thereof will not result in a violation of the quantity restrictions contained in paragraph (f) of said regulation. (Reg. 5 (c) (1))

Steel. The undersigned hereby certifies to the distributor with whom this order is placed and to the WPB, subject to the criminal penalties provided in section 35 (A) of the U. S. Criminal Code, that receipt of the steel covered by this order, together with all other steel received by, or on order for delivery to, the undersigned, from all sources, during the same quarter, will not exceed the limits specified. (Reg. 4 (d))

For the Priorities portion of The Iron Age Guide please refer to page 16.

5

Definitions of CMP Terms

Allotment means a determination by the WPB Requirements Committee of the amount of controlled materials which a Claimant Agency may receive during a period, or a further determination under it by a Claimant Agency, Industry Division, prime consumer or secondary consumer, of the portion of an allotment which may be received by one prime consumer secondary consumers. (Reg. 1 (b) (5))

Aluminum means aluminum in any of the forms and shapes constituting controlled material as defined in CMP Reg. No. 1 (Reg. 4 (g) (1))

Authorized production schedule means a production schedule approved within the limits of an authorized program by a Claimant Agency, Industry Division, prime or secondary consumer. (Reg. 1 (b) (13))

Authorized program means a program authorized by the Requirements Committee, Claimant Agency or Industry Division within the limits of its allotment. (Reg. 1 (b) (11))

Brass mill product means sheet, wire, rod or tube made from copper or copper base alloy. (Reg. 4 (e) (1))

Claimant Agency means the following government offices and such others as may be designated from time to time.

- War Department (W)—except Ordnance which is identified by the symbol (O)
- Navy Department (N)
- Maritime Commission (M)
- Aircraft Resources Control Office (agent for Army Air Forces and Bureau of Aeronautics of United States Navy) (C)
- Office of Lend-Lease Administration (L)
- Board of Economic Warfare (E)
- Office of Civilian Supply (S)
- Department of Agriculture (A)
- Office of Defense Transportation (T)
- Office of Rubber Director (R)
- Facilities Bureau of the War Production Board (F)
- Petroleum Administration for War (P)
- National Housing Agency (H)
- Office of War Utilities Director (U)

The symbol (D) will be used to identify certain programs covering items destined for the Dominion of Canada. (Reg. 1 (b) (4))

Class A product means any product which is not listed in the official CMP Class B Product List, and which contains steel, copper or aluminum, fabricated or assembled beyond the forms and shapes specified in Schedule I, other than steel, copper or aluminum contained in Class B products incorporated in it as parts or sub-assemblies. (Reg. 1 (b) (8))

Class B product means any product listed in the most current WPB "Official CMP Class B Product List" which contains steel, copper or aluminum, fabricated or assembled beyond the forms and shapes specified in Schedule I, other than incorporated parts or sub-assemblies. (Reg. 1 (b) (9))

Controlled material means steel—both carbon (including wrought iron) and alloy-copper (including copper base alloys) and aluminum, in each case only in the forms and shapes indicated in Schedule I. (Reg. 1 (b) (1))

Controlled Materials Division means the Steel, Copper or Aluminum Divisions of the War Production Board. (Reg. 1 (b) (2))

Distributor, Aluminum means any person who is specifically authorized by the WPB to engage in the business of receiving aluminum for sale or resale. (Reg. 4 (g) (2))

Industry Division means the WPB Division,

Bureau, or other designated agency which is charged with supervision of the operations of an industry. (Reg. 1 (b) (3))

Item of controlled material means any steel, copper or aluminum product which is different from all other products by reason of dimension, form, Physical, or finish. See Inventory Schedule A. (Reg. 2 (a) (1))

Maintenance means the minimum upkeep necessary to continue a facility in sound working condition, and "repair" means the restoration of a facility to sound working condition when the same has been rendered unsafe or unfit for service by wear and tear, damage, failure of parts or the like: **Provided**, that neither maintenance nor repair shall include the improvement of any plant, facility or equipment, by replacing material which is still usable, with material of a better kind, quality or design, except minor items of capital equipment and minor capital additions not exceeding \$500 (including cost of labor). (Reg. 5 (b) (1))

Operating supplies means any materials or products which are normally carried by a person as operating supplies according to established accounting practice and are not included in his finished product, except that materials included in such product which are normally chargeable to operating expense may be treated as operating supplies. The term shall also include such items as hand tools, customarily purchased by the particular employer for sale to his employees for use only in his business, in those cases where they would constitute operating supplies under established accounting practice if issued to employees without charge. The term shall not include any of the items specified in MRO List. (Reg. 5 (b) (2))

Production materials required by a manufacturer for incorporation in his products, which he sells for use as maintenance, repair, or operating supplies, may be obtained as provided in CMP Reg. No. 1 and in CMP Reg. No. 3, and such production materials

shall not be deemed maintenance, repair operating supplies, as to such manufacturing items. (Reg. 5 (b) (4))

Prime consumer means any person who receives an allotment of controlled material from a Claimant Agency or an Industry Division. (Reg. 1 (b) (6))

Production material means material or products to be incorporated into his product, and includes material normally consumed or converted into scrap in the course of processing. It also includes items purchased by a manufacturer for resale to round out his line, such items do not represent more than 10 percent of his total sales. It does not include any items purchased by him as manufacturing equipment or for maintenance, repair operating supplies. (Reg. 3 (b) (1))

Production schedule means a plan specifying the quantity of an item or class of items to be produced by a consumer in a period. (Reg. 1 (b) (12))

Program means a plan detailing the total amount of an item or class of items to be provided in a period. (Reg. 1 (b) (10))

Secondary consumer means any person who receives an allotment of controlled material from a prime consumer or another secondary consumer. (Reg. 1 (b) (7))

Steel Distributor means any person including a warehouse, jobber, dealer or retailer who is engaged in the business of receiving steel for sale or resale and who does not process the material so sold otherwise than cutting to length, shearing to size, torch cutting or burning to shape, sorting or grading, or pipe threading. (Reg. 4 (b) (2))

Warehouse means any industrial supply mill supplier, plumbing supply house, or other person engaged in the business of distributing brass mill products or wire mill products to industry or trade otherwise than as a controlled materials producer. (Reg. 4 (e) (3))

Wire mill product means bare or insulated wire or cable for electrical conduction made from copper or copper base alloy. (Reg. 4 (e) (2))

6

Inventory Limitations

Adjustment to production. To avoid increasing inventory beyond 60 day limit, a purchaser shall promptly adjust outstanding orders, applications and scheduled deliveries, and if necessary, postpone or cancel them whenever his normal production is slowed up or stopped. (Reg. 2 (d))

Applications, geographical. Inventory regulation shall not apply to persons outside the 48 states and the District of Columbia, except by specific WPB direction. (Reg. 2 (f))

Deliveries, prohibited. No person shall deliver any controlled material if he knows or has reason to believe that the acceptance of the delivery would be a violation of the 60 day inventory limit. (Reg. 2 (g))

Limitation, general maximum. No purchaser shall after April 1, 1943, accept delivery of controlled material if by doing so his inventory will become greater than the quantity required by production schedules to be put into use during the next 60 days. (Reg. 2 (b) (1)) Prohibition against more than minimum practicable inventory. (Reg. 2 (b) (3))

Limitation, exceptions. A person may accept delivery of material in excess of the prescribed limit under the following circumstances:

1. If any mill exercises its privilege under

CMP Reg. 1 of making delivery prior to the delivery date specified by the purchaser, such delivery may be accepted and the 60 day limit exceeded to the extent that the prior delivery increases inventory.

2. If a purchaser has promptly instructed a mill or other supplier to reduce, postpone, or cancel a delivery and the material has been shipped or loaded for shipment before receipt of instructions, material delivery may be accepted and the 60-day limit exceeded to the extent mistaken delivery increases inventory.

3. If a purchaser is authorized to accept delivery of a quantity of controlled materials less than the minimum shown in Inventory Schedule A, he may accept delivery of the minimum shown on the Schedule.

4. If a purchaser has promptly instructed a mill to reduce or postpone delivery of a special item which cannot be readily disposed of in the course of the mill's business, and the mill advised the purchaser that it has already started production stating the minimum quantity it would have to complete in view of the material put in process, the purchaser may accept delivery of the minimum quantity and thereby exceed the prescribed 60-day inventory limit. This exception applies only to delivery acceptance of special items before

needed, and not to delivery acceptance when items are not needed. (Reg. 2 (c))

Redistribution. Excess inventories, including stocks which are not in a form usable by the holder, may be directed to be sold to other manufacturers, or may be requisitioned by WPB. (Reg. 2 (h))

Reports. Purchasers shall file inventory reports on Form CMP-7. (Reg. 2 (i))

Separate. In determining his inventory, a person shall include all controlled material in his possession and all material held for him

by another person, but not material held by him for another.

A person who has more than one operating unit may divide his operations and apply the inventory regulation to each division separately. He may not thereafter change the manner of dealing with inventories of such divisions without WPB approval. Any person who has been operating under PRP shall continue to divide his operations in the same manner as under that plan. (Reg. 2 (e))

Schedule A. See Schedules.

Maintenance Materials

Application. (1) Persons requiring maintenance, repair and operating supplies in quantities available from warehouses or distributors under CMP Reg. No. 4, or at retail without preference ratings, or allotments, may obtain them without using the procedure provided in the MRO regulation, but subject to all applicable limitations in WPB regulations and orders.

(2) The provisions of this regulation shall not apply to governmental agencies (Claimant Agencies excepted) except to the extent that they may be engaged in one of the activities listed in MRO Schedules 1 or 11, and do not apply to any person or institution, public or private, engaged in educational, religious or charitable activities. (Reg. 5 (a))

Assistance in individual cases. Any person requiring maintenance, repair or operating supplies who is unable to obtain them through ordinary procedure of CMP Reg. No. 5, may apply to the WPB for additional assistance on an appropriate form, having regard to the material required and the business activity involved. If no particular form is specified by applicable WPB orders or regulations, such application may be made on Form PD-1A or on Form PD-25F. Applications may be filed with the appropriate Industry Division, or, if the amount involved is less than \$500, with the regional office of the WPB. (Reg. 5 (j))

Certification, aluminum, copper and steel. See Certification.

Industry reclassification. Any person who is of the opinion that the business activity in which he is engaged should be shifted from MRO Schedule I, to MRO Schedule II, or vice versa, or is not listed in either schedule, may apply to have his listing changed or listed by filing a letter, in triplicate, with the appropriate Industry Division setting forth the reasons he considers the request should be granted. (Reg. 5 (l))

Multiple operations. If a single plant or operating unit is engaged in several activities which are not all listed on the same schedule (or if some are so listed and others are unlisted), and it is impracticable to apportion requirements for maintenance, repair and operating supplies between such activities, the principal activity alone shall be considered for purposes of determining whether controlled materials may be obtained. (Reg. 5 (e) (1))

Preference ratings. (1) Orders calling for delivery after March 31, 1943, of maintenance, repair or operating supplies other than controlled materials are assigned preference ratings as follows:

AA-1 for maintenance or repair of facilities required for producing any product or conducting any business listed in MRO Schedule 1 or for necessary operating supplies for such production or business;

AA-2X for maintenance or repair of facil-

ities required for producing any product or conducting any business listed in Schedule MRO II or for necessary operating supplies for such production or business; and

A-10 for necessary maintenance or repair of facilities for producing any product or conducting any business not listed in MRO Schedule I or Schedule II or for necessary operating supplies for any such purpose.

A preference rating assigned under this paragraph (d) shall be applied only by use of the following MRO certification:

Preference rating (specify rating)

..... MRO. The undersigned certifies, subject to the criminal penalties for misrepresentation contained in section 35 (A) of the U. S. Criminal Code, that the items covered by this order are required for essential maintenance, repair or operating supplies; that this order is rated and placed in compliance with CMP Regulation No. 5; and that the delivery requested will not result in a violation of the quantity restrictions contained in paragraph (f) of said regulation.

A person with whom an order is placed bearing a preference rating assigned by Regulation No. 5 may extend the rating only in the manner provided in Pri. Reg. No. 3 (using the endorsement therein specified) and subject to the limitations contained therein and in CMP Reg. No. 2. (Reg. 5 (d) (3))

The preference ratings assigned by CMP Reg. 5 shall supersede the preference ratings assigned by all orders in the "P" series for

maintenance, repair and operating supplies with respect to materials or products to be delivered after March 31, 1943. (Reg. 5 (k) (1))

Schedules I and II. See Schedules.

Quantity restrictions. (1) No person shall use the allotment symbol or preference ratings assigned by CMP regulation No. 5 to obtain maintenance, repair or operating supplies during any quarter in an aggregate amount exceeding one-fourth of his aggregate expenditures for maintenance, repair and operating supplies during 1942 (or his fiscal year ending nearest to Dec. 31, 1942), except that a person engaged in a seasonal business may use the allotment symbols or preference ratings to obtain during any quarter, up to, but not in excess of, his aggregate expenditures for maintenance, repair and operating supplies during the corresponding quarter of 1942 or fiscal year. In neither case shall any person use allotment symbols or preference ratings to obtain maintenance, repair and operating supplies during the 12 months ended March 31, 1944, in an amount exceeding his aggregate expenditures for maintenance, repair and operating supplies during 1942 or fiscal year.

(2) A person who has several plants or other operating units which maintain separate records of maintenance, repair and operating supplies shall treat each of them separately for purposes of complying with the quantity provisions.

(3) Where a plant or other operating unit was not in operation during 1942, the person operating the same may take, as a base, his expenditures for maintenance, repair and operating supplies during the first quarter of 1943, or during the portion thereof when the plant or unit was in operation, reasonably adjusted for seasonal or other variable factors; provided, that he first notifies WPB in writing of the base which he is taking, the reasons therefor, and the nature of any adjustments made. In the case of a plant starting operations after Feb. 28, 1943, maintenance, repair, and operating supplies may be acquired pursuant to CMP Reg. 5 in the minimum amounts necessary for operation, without other restrictions, up to \$5,000 per quarter. If more than \$5,000 is required, application shall be made in writing to WPB for a specific quota. (Reg. 5 (f))

8

Mill Operations Under CMP

Allotment or rating extension. A CMP mill is prohibited from extending ratings or allotments received from a customer. (Reg. 8 (e))

Application for allotments. Where a CMP mill requires delivery after March 31, 1943, of controlled materials or Class A products, it may apply for an allotment on Form CMP 4B. Aluminum required for deoxidizing and alloying purposes, thermite reaction, chemical uses and wire for armored cable—Form CMP 13 shall be used for making application for aluminum for the foregoing purposes.

Applications on CMP 4B made by a CMP mill shall be directed to the appropriate CMP division even if a different controlled material is involved. (A copper mill's needs for steel should be stated to the WPB Copper Division.) Application on Form CMP-13 should be directed to the WPB Aluminum Division, Washington, D. C. In applications, CMP 4B filed by a mill for controlled material, Sections A, D, and E of the form should be omitted.

Allotment of controlled materials will be made to CMP mills in the same manner as for allotments made for the production of Class A and Class B products. CMP mills receiving an allotment have the same rights and duties as prime contractors, provided that

a CMP mill receiving allotments of controlled materials will receive from its CMP Division, production directions.

Where the controlled material required is made out of the same metal produced by the CMP mill and no class A product is required, requirements of the CMP mill for controlled materials not produced by him will be filed only by directions issued by the Director of the appropriate CMP Division. Where the controlled material required is made of a different metal from that produced by the CMP mill, or where Class A products are needed, the filling out of CMP 4B will be sufficient. (Reg. 8 (c))

Assignment of preference ratings-allotment symbols. Preference rating of AA-1 is assigned to deliveries of production materials, other than controlled materials, required by a CMP mill which has received specific authorization from the appropriate CMP division to operate under CMP Reg. 8. No CMP mill shall use the rating or allotment symbol assigned by CMP Reg. 8 in the absence of authorization. Application may be made by letter to the appropriate CMP division.

The allotment symbol X-1 is assigned to each CMP mill authorized to operate under CMP Reg. 8 solely for use with the preference rat-

ing assigned. The assignment of the symbol does not constitute an allotment and the symbol shall not be used to obtain controlled materials. (Reg. 8 (d))

Duplicate allotment. No consumer shall include in a bill of materials or application for allotment, a request for controlled materials which a mill would require to produce the controlled material. Where a consumer has actually received an allotment of controlled materials which should have gone to a mill, or a Class A product of the same category, he

shall make an allotment to the CMP mill concerned. The CMP mill receiving the allotment shall cancel it and report the cancellation within 15 days to the appropriate CMP division. (Reg. 8 (e) (4))

Purchase Order requirements. Each CMP mill shall place on each purchase order for materials, other than controlled materials, the allotment symbol assigned by CMP Reg. 8 or by the related allotment certificate, and shall accompany or endorse it with the same certification provided by CMP Reg. 3. (Reg. 8 (f))

9 Preference Ratings and Allotment Numbers

Extension, distributor. A dealer, distributor, jobber or other person who receives a rated order bearing an allotment number or symbol for any uncontrolled material which is not manufactured by him, (or which is manufactured by him, but for the manufacture of which he has received no authorized production schedule), may extend the rating to the extent permitted by Priorities Regulation No. 3, with the same allotment number or symbol, using the proper certification. (See Certification.) If he places a single rated order to which he extends ratings bearing different allotment number or symbols, he shall include a statement indicating all the allotment numbers or symbols extended and the amount of the delivery order (in quantity or dollar value) represented by each. He may extend the rating without any allotment number or symbol. (Reg. 3 (f) (4))

Extension, none. A prime consumer who manufactures Class B products and has received an authorized production schedule for such manufacture, accompanied by a preference rating to be used with his allotment number, shall not extend any other rating received by him from a customer. If a delivery to be made by him is rated AAA, he may extend said rating to the extent necessary to obtain production material required to fill his AAA order, but may not extend the same for purposes of replenishing his inventory. (Reg. 3 (e))

Each prime or secondary consumer shall place on each rated order for production materials his allotment number with a certification. (See Certification.) (Reg. 3 (f) (1))

Prime consumers. When an allotment is made to a prime consumer making Class A or Class B products and his production schedule is authorized by a Claimant Agency or an Industry Division, a preference rating will be assigned to such schedule for use with the allotment number applicable to the schedule. (Reg. (d) (1))

Priority. Authorized controlled material orders placed with controlled materials producers shall be accepted and filed by such producers as provided in CMP Regulation 1 without regard to any preference ratings applicable to such delivery orders and in preference to all other delivery orders. To the extent that controlled materials producers are able to fill orders other than authorized controlled material orders, they shall fill such orders until July 1, 1943, in accordance with preference ratings as provided in Priorities Reg. 1 and subject to any other applicable WPB regulations or orders.

Authorized controlled material orders placed pursuant to applicable CMP Regulations, with persons who are not controlled materials producers, shall be filled by them without regard to any preference ratings applicable to such delivery orders and in preference to all other delivery orders, except as otherwise specifically provided in WPB applicable regulations or orders. An exception to the foregoing rule is where an au-

thorized controlled material order placed with any person which is rated AAA shall take precedence over other authorized controlled material orders. (Reg. 3 (j))

An order bearing a preference rating with an allotment number or symbol shall be deemed superior in rating, for purposes of Priorities Reg. 1, to any order bearing a rating of the same grade without an allotment number or symbol, but shall not be superior to another order bearing a rating of a higher grade. (Reg. 3 (c) (1))

No person shall accept an allotment for the manufacture of a Class A product, regardless of the accompanying preference rating, if he does not expect to be able to fulfill the related authorized production schedule.

No person who has accepted an allotment and an authorized production schedule for a Class A product shall thereafter accept any purchase order (except an order rated AAA) for any Class A, Class B, or other product manufactured by him unless he expects that he can fill the order without interfering with the fulfillment of previously accepted authorized production schedules.

A person making Class B products to fill unrated or low rated orders must accept higher rated orders to the extent, unless he is also making a Class A product on an authorized production schedule, with which such higher rated orders would interfere.

If a person whose allotment or purchase order is rejected is unable to find another supplier who is in a position to accept it, he should report the facts to the appropriate

Claimant Agency or Industry Division, WPB or the appropriate Claimant Agency if only orders bearing its symbol are involved, or if all Claimant Agencies have stipulated a single Claimant Agency for the purpose may make exceptions to the foregoing.

The provisions of Priorities Regulation No. 1 with respect to the acceptance and filling of rated orders and the sequence of deliveries shall remain applicable except as otherwise specifically provided in CMP Reg. No. 3, or any other applicable WPB regulations.

Where a manufacture of Class A or Class B products is unable to fulfill conflicting authorized production schedules which he has accepted from different persons, he shall immediately report to the appropriate Industry Division for directions, or Claimant Agency as the case may be. (Reg. 1 (p) (q))

Reduction or cancellation. A person who has made an allotment may cancel or reduce it by notice in writing to the person to whom it was made. A person who has received an allotment may cancel or reduce it by making an appropriate notation thereon and notifying the person from whom he received it. In either case, if an allotment received by a person is cancelled he must cancel all allotments which he has made, and all authorized controlled material orders which he has placed, on the basis of the allotment. If an allotment received by a person is reduced, he must cancel or reduce allotments which he has made, or authorized controlled material orders which he has placed, to the extent that the same exceeds his allotment as reduced. If cancellation or reduction is not practicable, he may make equivalent cancellations or reductions with respect to other allotments received by him for the same production schedule. If he deems this course of action impracticable, he shall immediately report to the appropriate Claimant Agency or Industry Division for instructions. (Reg. 1 (i))

Secondary consumers. When an allotment is made to a secondary consumer making Class A products and his production schedule is authorized by the consumer making the allotment, the consumer making the allotment shall apply or extend to such production schedule the same rating as he has received for his own related production schedule for use with the appropriate allotment number. (Reg. 3 (d) (2))

Use, existing. A person who has not yet received his allotment and CMP rating for a particular production schedule may apply and extend other preference ratings for such production to the extent permitted by existing priorities regulations and order.

Any prime or secondary consumer who receives a rating with an authorized production schedule may, in lieu of using said rating, continue to apply or extend any ratings previously received which he is authorized to use, under existing priorities regulations or orders, for deliveries to be made to him during the second quarter of 1943. In authorizing production schedules for his secondary consumers to whom he has already applied or extended a rating previously received by him, he may extend the appropriate allotment number for use with such previously received rating instead of with the rating which he has received under CMP. (Reg. 3 (h) (2))

Use, limitation. A prime or secondary consumer who has received a preference rating for an authorized production schedule may use the rating with the appropriate allotment number, only to acquire production materials in the minimum practicable amounts required to fulfill schedules, or to replace production materials in his inventory. (Reg. 3 (d) (3))

CMP Materials List

Controlled Materials

Aluminum
Copper and Copper Base Alloys
Steel

Other Materials

Beryllium
Cadmium
Cobalt—other than as an alloying element
Cordage Fibers
a. Manila
b. Sisal
c. Jute
d. Istle
Magnesium
Mercury
Mica—other than ground mica
Monel—natural
Nickel—other than as an alloying element
Nylon
Rayon—high tenacity
Rubber
a. Crude
b. Liquid latex
c. Reclaimed
d. Synthetic
Tin
Tungsten—other than as an alloying element
Wood
Zinc

Requirement Statements

The furnishing of bills of materials, application for allotment or other information of requirements by a consumer, shall constitute a representation to the person to whom it is furnished, to the appropriate Claimant Agency and to WPB, that the statements contained herein are complete and accurate, to the best of his knowledge and belief, not only with respect to such consumer's own requirements but also with respect to those of his secondary consumers. (Reg. 1 (e) (1))

Any person who ascertains that he has substantially overstated his requirements, or those of his secondary consumers, shall immediately report the error to the person to whom the statement of requirements was furnished. If he has already received an allotment based on the overstatement, he shall immediately cancel or reduce the same (or an equivalent amount of other allotments received for the same authorized production schedule) to the extent of such excess, and report such cancellation or reduction to the person from whom the allotment was received; if he is unable to make the cancellation, he shall immediately make a report to the person from whom he received the allotment, and shall send a copy of the report to the appropriate Claimant Agency or Industry Division, if the allotment was received from another consumer. (Reg. 1 (e) (2))

If any consumer receives a statement of requirements which he knows or has reason to believe is substantially excessive, he shall withhold the allotment based thereon (either entirely or in an amount sufficient to correct the maximum excess). If unable to obtain sufficient information or an appropriate modification, he shall promptly report the matter to the appropriate Claimant Agency or Industry Division. Failure to withhold allotments or to report shall be deemed participation in the offense. (Reg. 1 (e) (3))

If, after making an allotment, a consumer ascertains or believes that the allotment was substantially in excess of actual requirements, he shall either correct the excess by cancelling or reducing the allotment or other allotments made by him to the same consumer or report the matter promptly to the appropriate Claimant Agency or Industry Division. Failure to make correction or report shall be deemed participation in the offense. (1e (4))

An inadvertent overstatement of requirements shall be deemed substantially excessive if it exceeds actual requirements by either one-third or more the minimum mill quantity stated in Schedule IV, whichever is less. (Reg. 1 (e) (5))

Instructions for Use of Short Form of Allotment—Form CMP-5

The above short form of allotment may be used by any consumer for the purpose of making an allotment to a secondary consumer producing Class A products for him. The short form of allotment must be either placed on or physically attached to the delivery order calling for delivery of the Class A products. If it is attached the delivery order number or other identification must be indicated on the form.

The form must be followed by the signature of an authorized official of the consumer making the allotment.

Under the heading "Controlled Material Products Allotted" the person making the allotment must designate the forms which are allotted. These must be shown in the breakdown prescribed in Schedule I of CMP Regulation No. 1, and must be within the allotments received by such consumer for the same forms.

SCHEDULE III.—Time for Placing Authorized Controlled Material Orders

Note: Delivery orders may be placed in advance of receiving allotments, and converted into authorized controlled material orders on receipt of allotments, as provided in paragraph (s) (6) of CMP Regulation No. 1.

STEEL

Number of days in advance of first day of month in which shipment is required

Product	
Alloy steel (including stainless steel):	
Hot rolled bars and semi-finished.....	75
Bars—cold finished	105
Sheet and strip—hot and cold rolled...	105
Plates—hot rolled	75
Tool steel:	
Hot rolled products	90
Cold finished products	120
Cold finished bars:	
Carbon bars—standard sizes, grades and sections	70
Carbon bars—furnace treated at hot mills or special section, odd sizes or special grades	100
Alloy bars	105
Plates and shapes:	
Carbon steel plates	30
Carbon steel structural shapes	45
Alloy steel plates and shapes	75
Pipe	30
Sheet and strip:	
Sheet—hot rolled—16-gage and heavier..	30
Sheet—hot rolled—17-gage and lighter..	45
Sheet—cold rolled—galvanized—long	
terne	45
Strip—hot rolled (low carbon).....	30
Strip—cold rolled (low carbon).....	45
High carbon cold rolled strip (over .25 carbon) and other long processed special carbon hot rolled and cold rolled sheets and hot and cold rolled strip (including electrical grade)....	60
Hot rolled carbon bars and semi-finished: Except for carbon bars heat treated and annealed	30
Carbon bars heat treated and annealed.	60
Tin mill products	30
Tubing:	
Carbon steel—hot finished	30
Carbon steel—cold drawn:	
1½" and larger	45
Under 1½"	75
Alloy steel—hot finished	90
Alloy steel—cold drawn:	
1½" and larger	110
Under 1½"	120

Schedules
Regulation No. 1SCHEDULE I
STEEL

Carbon Steel

Forms and shapes.
Bars, cold finished.
Bars, hot rolled.
Ingots, billets, blooms, slabs, tube rounds, skelp and sheet and tin bar.
Pipe.
Plates.
Rails and track accessories.
Sheets and strip.
Steel castings.
Structural shapes and piling.
Tin plate, terne plate, and tin mill black plate.
Tubing.
Wheels, tires and axles.
Wire rods, wire and wire products.

Alloy Steel

Forms and shapes.
Bars, cold finished.
Bars, hot rolled.
Ingots, billets, blooms, slabs, tube rounds, sheet bar.
Pipe.
Plates and structural shapes.
Sheets and strip.
Steel castings.
Tubing.
Wheels, tires and axles.
Wire rods, wire, and wire products.
Note: Steel in any of the above forms and shapes constitutes controlled materials, but allotments of steel are made in terms of (1) carbon steel (including wrought iron) and (2) alloy steel, without further breakdown.

COPPER

Brass Mill Copper Base Alloy Products

Forms and shapes.
Ammunition cups, discs and slugs.
Sheet and strip (other than cups and discs)
Rods, bars, and wire (including extruded shapes not including slugs).
Tubing and pipe.

Brass Mill Copper Products

Forms and shapes.
Plate, sheets and strip.
Rods, bars and extruded shapes (excluding wire bars and ingot bars).
Tube and pipe.

Wire Mill Copper Products

Forms and shapes.
Wire and cable (including copper content of insulated wire and cable).

Foundry Copper and Copper Base Alloy Products

Forms and shapes.
Castings.
Note: Allotments of copper are made in the forms and shapes specified above.

ALUMINUM

Forms and shapes.
Rod, bar, wire and cable.
Rivets.
Forgings, pressings and impact extrusions.
Castings.
Shapes, rolled or extruded.
Sheet, strip, plate and foil.
Tubing.
Ingot and powder.
Note: Allotments of aluminum are made in the forms and shapes specified above.

SCHEDULE II—SHORT FORM
OF ALLOTMENT

Allotment number	Controlled Material Products allotted		

Above allotments are made for use in filling this delivery order in compliance with CMP Regulation No. 1.

Product	No. Days
Steel castings:	
Providing patterns are available:	
Weight per casting:	
500 pounds and under	30
Over 500 pounds to 5000 pounds	45
Over 5000 pounds to 30,000 pounds	60
Over 30,000 pounds	75
Wire and wire products:	
Hot rolled wire rods	30
Merchant trade products	30
Manufacturing wires:	
Low carbon .0475" and heavier	45
Low carbon under .0475"	60
High carbon (0.40 carbon and higher)	
.0475" and heavier	45
Under .0475" to .021"	60
Under .021"	75
Wire and wire products—Continued	
Wire rope and strand:	
3/4" and over	75
9/16" and under	105
Welded wire-reinforcing fabric	45

COPPER

Brass mill copper and copper base alloy products:	
Copper and non-refractory alloys	45
Refractory alloys	60
Wire and cable products:	
Bare wire and cable	35
Weatherproof wire and cable	35
Magnet wire	35
Rubber insulated building wire	35
Paper and lead cable	40
Varnished cambric cable	35
Asbestos cable (type H-F)	60
Rubber insulated wire and cable (Mold or lead cured)	45
Foundry copper and copper base alloy products:	
Castings (rough castings, not machined—assuming patterns are available)	
Small simple castings to fit 12" by 16" flask	7
Large intricate and centrifugal castings	14

ALUMINUM

All forms and shapes 45

Where no time is specified in Schedule III for placing orders for a particular form or shape of controlled material, the time for placing such orders shall be subject to agreement between the consumer and the controlled materials producer, provided that no producer shall discriminate between consumers in the acceptance of orders. In the event of any disagreement, the matter should be referred to the appropriate Controlled Materials Division.

SCHEDULE IV.—Minimum Mill Quantities
STEEL

Product	Size and grade for shipment at one time, to one destination
Alloy steel (other than stainless):	
Standard grades and sections:	
Rounds, squares 3" and under	5 net tons.
Hexagon and flats—all sizes	5 net tons.
Stainless steel:	Product of
Standard grades and sections	one ingot.
Tool steel	500 pounds.
Cold finished bars	3 net tons.

Product	Size-Grade
Hot rolled carbon bars and semi-finished:	
Round bars up to 3" incl., and squares, hexagons, half rounds, ovals, half ovals, etc., of approximate equivalent sectional area	5 net tons.
Round bars over 3" to 8" (including squares within this range)	15 net tons.
Flat bars, all sizes	5 net tons.
Bar size shapes (angles, tees, channels and tees under 3")	5 net tons.
Forging billets, blooms and slabs	Product of
Rerolling billets, slabs, sheet one ingot.	
bars, skelp	25 gross tons.
Plates:	
Continuous strip mill production	10 net tons.
Sheared mill, universal mill or bar mill production	3 net tons.
Structural shapes	5 net tons.
Pipes	(1)
Sheet and strip:	
Sheets—hot and cold rolled	5 net tons.
Strip—hot and cold rolled	3 net tons.
Tin mill products (one gage)	5000 pounds.
Tubing:	
Carbon and alloy steel—cold drawn:	
O.D. (inches):	
Up to 3/4" inclusive	1000 feet.
Over 3/4" to 1 1/2" inclusive	800 feet.
Over 1 1/2" to 3" inclusive	600 feet.
Over 3" to 6" inclusive	400 feet.
Over 6"	250 feet.
Wire and wire products:	
Hot rolled wire rods	5 net tons.
Merchant trade products (Assorted Merchant Products)	5 net tons.
Manufacturing wires (wires for further fabrication):	
Low carbon	1 net ton.
High carbon (0.40 carbon and higher) .0475" and heavier	1 net ton.
Under .0475" to .021"	1000 pounds.
Under .021"	500 pounds.
Wire rope and strand	1000 ft. lengths.
Welded wire reinforcing fabric	(2)
Rails and track accessories:	
Guard rail clamps, clip bolts, nut locks, S-irons, rail braces	3 net tons.
Track spikes, track bolts, screw spikes, rail clips, gage rods	5 net tons.
Rail anchors	15 net tons.

COPPER

Brass mill products	200 pounds.
Wire mill products	300 pounds.

ALUMINUM

Sheet and strip	500 pounds.
Tubing	250 pounds.
Extrusions	200 pounds.
Wire, rod and bar	200 pounds.
Rivets	50 pounds.

¹ Published carload minimum (mixed sizes and grades).

² Full rolls of manufacturer's standard stock sizes.

Regulation No. 2
SCHEDULE A

If a user of controlled materials would be authorized under paragraph (b) to accept delivery of a quantity of an item of controlled material less than the minimum shown opposite the appropriate class of controlled material on the following schedule, he may accept delivery of the full minimum shown on the schedule.

INVENTORIES

CMP material code No.	Class of controlled material	Minimum quantities Lbs.
	Aluminum	
	Bar and rod (excluding requirements for stock for wire, forgings, rolled structural shapes, and electrical cable)	500
4021	3/8"-3/4" incl.	Maximum diameter (for rounds and ovals).
4031	Over 3/4"-1 1/2" incl.	Maximum distance between parallel faces (for squares, hexagonals, octagonals and rectangles.)
4041	Over 1 1/2"-3" incl.	
4051	Over 3"	
4121	Wire, excluding rivet wire. (Wire covers maximum diameters under 3/8" in rounds, ovals, squares, hexes, octagonals and rectangles)	100
4122	Rivets	25
4151	Cable (electrical transmission only)	2,000
4171	Forgings and pressings (before machining) Castings made from high-grade ingot (before machining)	500
4202	Cylinder heads for air-cooled radial engines.	
4203	Other heat treated sand castings.	
4204	Non-heat treated sand castings.	
4205	Heat-treated permanent mold castings.	
4206	Non-heat treated permanent mold castings.	
4207	Cold-chamber die castings.	
4208	Gooseneck die castings.	
	Castings made from low-grade ingot (before machining)	500
4213	Heat treated sand castings.	
4214	Non-heat treated sand castings.	
4215	Heat treated permanent mold castings.	
4216	Non-heat treated permanent mold castings.	
4217	Cold-chamber die castings.	
4218	Gooseneck die castings.	
4251	Rolled structural shapes (angles, channels, tees, etc.)	500
	Extruded shapes	100
4301	2S, 3S, 53S, and 61S alloys.	
4311	All alloys except 2S, 3S, 53S, and 61S.	
	Sheet, strip and plate (excluding stock for foil, impact extrusions, and forgings).	200
4351	2S, and 3S alloys.	
4361	Alloys other than 2S and 3S.	
	Tubing	100
4401	2S and 3S alloys.	
4411	Alloys other than 2S and 3S.	
4501	Powder	15
4601	Foil (0.005" and thinner)	25
4701	Impact extrusions.	200
	Ingot (excluding ingot for aluminum castings, sheet, plate, strip, rod, bar, extrusions, and powder)	2,000
4801	High-grade ingot.	
4811	Low-grade ingot.	
	Copper and Copper Base Alloys	Lbs.
	Brass mill products:	
	(A) Copper base alloys:	
3001	Ammunition cups, disks, and slugs	5,000
3011	Sheet and strip (other than cups and disks)	500
3021	Rods, bars, and wire (incl. extruded shapes, not incl. slugs)	500

CMP material code No.

Copper

341

351

361

371

381

391

401

411

421

431

441

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461

471

481

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991

INVENTORIES

Regulation No. 5

MRO LIST A

The following items are excluded from the definition of "operating supplies" in paragraph (b) (2) of CMP Regulation No. 5, regardless of whether normally carried as such according to established accounting practice:

1. Fabricated containers (in knock-down or set-up forms, whether assembled or unassembled), required for packaging products to be shipped or delivered.

2. Printed matter and stationery.

3. Paper, paperboard, and products manufactured therefrom; molded pulp products.

4. Fuel or electric power.

5. Office machinery or office equipment.

6. Clothing, shoes or other wearing apparel, if made of leather or textiles, except that the following types may be included in operating supplies when specially designed and used to furnish protection against specific occupational hazards (other than weather):

a. Asbestos clothing.

b. Safety clothing impregnated or coated for the purpose of making the same resistant against fire, acids, other chemicals or abrasives.

c. Safety industrial rubber gloves and hoods and linemen's rubber gloves and sleeves.

d. Gauntlet type welders' leather gloves and mittens, and electricians' leather protector or cover gloves.

e. Other safety leather gloves or mittens, but only if steel stitched or steel reinforced.

f. Safety industrial leather clothing other than gloves or mittens.

g. Metal mesh gloves, aprons and sleeves.

h. Plastic and fibre safety helmets.

MRO Schedule I—Preference Rating AA-1

Manufacture of the following:

Unfabricated and semifabricated products:

Aluminum and aluminum alloy semifinished products.

Copper and copper alloy semifinished products.

Ferro-alloys.

Iron unfabricated and semifabricated products, including: forgings, pig iron, pipe, wire, wrought iron and foundry products.

Magnesium and magnesium alloy semifabricated products.

Nonferrous metal unfabricated and semifabricated products.

Steel unfabricated and semifabricated products, including: bars, forgings, pipe, rolling mill and foundry products, sheets, strips, structural steel, tubing, and railroad rails, frogs, switches and crossings.

Iron and steel finished products:

Aircraft landing mats.

Boiler-shop products, including: boilers, gas cylinders, steam condensers and tanks.

Bolts.

Cooking ranges and stoves, except electric.

Fabricated pipe.

Furnaces, including: heating stoves and related equipment.

Hand tools, except farm and garden.

Metal barrels, drums, kegs and shipping pails.

Nuts.

Rivets.

Saws.

Screws.

Steel springs.

Stove pipe.

Thermostats and other temperature control devices.

Transportation-equipment hardware.

Washers.

Water heaters, tanks and boilers.

Chemical products:

Acids.

Alcohols.

Alkalies.

Basic chemicals and intermediates.

Coal tar and coal tar derivatives.

Compressed and liquid gases.

Dyes, colors, and pigments.

Fats and oils (industrial only).

Lacquers.

Organic and inorganic chemicals.

Paints.

Plastics and synthetic resins.

Soap.

Solvents.

Varnishes.

Industrial machinery and equipment:

Chemical manufacturing machinery and equipment.

Compressors.

Conveying machinery and equipment.

Cranes, derricks, hoists and winches.

Electric furnaces.

Electrical industrial equipment.

Excavating machinery.

Fans and blowers (industrial).

Food-dehydration machinery.

Furnaces and ovens (industrial).

Gas generating equipment and apparatus.

Heat exchangers.

Industrial lubricating equipment.

Industrial machine-shop products.

Industrial trucks and tractors.

Instruments (industrial).

Machine tools and metal-working machinery, including: bending, forging, cutting, shearing, rolling, milling and pressing machinery.

Mechanical power-transmission equipment.

Mining machinery and equipment.

Ore milling, smelting and refining equipment.

Petroleum refining equipment.

Plastic working machinery.

Pumps.

Rubber-working machinery.

Stone, clay, and glass products manufacturing machinery.

Vacuum pumps.

Welding equipment, gas and electric, including welding rods and electrodes.

Well-drilling machinery.

Woodworking machinery (except cooperage and wooden box making machinery).

Direct-military products:

Aircraft, propellers, engines and parts.

Ammunition.

Ammunition boxes and chests.

Combat vehicles.

Explosives.

Ordnance.

Pyrotechnics.

Ships, equipment and parts, including vessels of all types.

Tanks, engines and parts (combat).

Electrical products:

Electrical carbon and graphite products.

Electric motors and generators.

Electrical instruments.

Floodlights.

Fuses.

Insulated wire and cable.

Motor-generator sets.

Physical-therapy equipment.

Pole-line hardware and insulators.

Searchlights.

Spotlights.

Storage batteries.

Switchgear.

Transformers.

Wiring devices and conduits.

X-ray equipment.

Regulation No. 4

WAREHOUSE SCHEDULE

(Quantities in pounds per quarter)

	Carbon (including wrought iron)	Alloy (other than stainless)	Stainless
Structural shapes and piling	8,000		
Plates	8,000	2,000	300
Hot rolled bars, including concrete reinforcing bars	6,000	2,000	300
Cold finish bars	4,000	2,000	300
Tool steel, including drill rod	300	300	
High carbon spring steel	300		
Tool steel bits	5		
Mechanical tubing	*1,000		300
Pressure tubing	*2,000		
Sheets and strip, hot rolled	6,000		
Sheets and strip, cold reduced	6,000		300
Sheets and strip, galvanized	6,000		
Sheets and strip, all other, including black plate	6,000		
Pipe	4,000		
Wire and wire products	4,000		100
Tin and terneplate	2,000		

* Feet.

MRO Schedule I—Cont.

Engines and turbines:
 Diesel engines.
 Gasoline engines.
 Hydro turbines.
 Steam engines and turbines.

Communication equipment:
 Communication equipment including telephone and telegraph systems and apparatus.

Fire alarm systems.
 Phonographs.
 Radio and radar equipment and tubes.
 Railroad signals and accessories.

Transportation equipment:
 Bicycles and parts.
 Locomotives, diesel, electric and steam.
 Motorcycles, side cars and parts.
 Railroad and street cars.

Miscellaneous products:
 Abrasive wheels, stones, papers and cloths.
 Agricultural machinery, implements and equipment.
 Air conditioning and commercial refrigeration equipment (mechanical).
 Closures (pressed paper and molded plastic).
 Elevators.
 Escalators.
 Fishing equipment (commercial).
 Glass containers.
 Jewel bearings.
 Laundry equipment (domestic).
 Motor vehicles, engines and parts (commercial).
 Navigation instruments.
 Optical instruments and lenses.
 Photographic apparatus.
 Professional, scientific and engineering instruments and appliances.
 Refractories.
 Refrigerators (mechanical).
 Rubber and rubber products (natural and synthetic).
 Safety equipment, including helmets, goggles and civilian defense items.
 Stokers.
 Tires and tubes.
 Tractors.
 Valves, faucets and fittings.
 Wooden, paper and fiber containers.

Persons engaged in the following industries:
 Analytical, research, testing, and control laboratories.
 Discovery, production, transportation, refining and marketing of natural gas, petroleum and petroleum products.
 Electroplating, galvanizing and other metal coating.
 Gas, light, power, water, central heating, and sanitary services.
 Industrial food production, processing, packaging, preservation and storage.
 Mining and quarrying.
 Public transportation and terminal facilities including stevedoring.
 Ship repair and maintenance.
 Smelting.
 Wire communications industry.

MRO Schedule II—Preference Rating AA-2X

Manufacture of the following:

Iron and steel finished products:
 Boilers and radiators (heating).
 Cutlery.
 Fabricated iron and steel wire products.
 Gas conversion burners.
 Hardware, except transportation-equipment hardware.
 Kitchen and household cans and pails.
 Lawn mowers.
 Metal bottle caps and closures, except beverage crowns.
 Metal cans.

Metal doors, window sash, frames, molding and trim.
 Metal furniture.
 Metal sanitary ware.
 Milk cans (bulk).
 Razors.
 Screens and weatherstripping.
 Steamtables and restaurant equipment.
 Tools, farm and garden.
 Vitreous enameled products.

Non-ferrous metal products:

Clocks.
 Collapsible tubes.
 Insignia.
 Pins, needles, hooks, eyes, snaps, buckles and fasteners.
 Time stamps and recording machines.
 Watches.

Non-metallic products:

Lumber, logs, plywood and veneer.
 Non-metallic sanitary ware.
 Textiles, clothing and leather goods.

Industrial machinery and equipment:

Business machines.
 Construction material.
 Cooperage and box making machinery.
 Food-processing machinery and equipment, except dehydration equipment.
 Laundry and dry-cleaning equipment.
 Leather working machinery.
 Metal container making machinery.
 Printing machinery.
 Pulp and paper machinery.
 Scales.
 Spraying equipment (industrial).
 Textile machinery.
 Water treatment equipment.

Electrical products:

Dry cell batteries.
 Electric bulbs and tubes.
 Electric ranges.
 Electric sound signalling devices.
 Lighting fixtures.

Fire protection equipment:

Fire engines.

Fire extinguishers.
 Fire hose and related equipment.
 Hydrants and related equipment.
 Sprinkler systems.

Transportation equipment:

Buses.
 Trailers (passenger-car).

Miscellaneous products:

Automotive testing equipment and instruments.
 Baby carriages.
 Church goods.
 Drugs and medicinals.
 Ice refrigerators.
 Mattresses and bed springs.
 Motion picture products.
 Musical instruments.
 Ophthalmic goods.
 Pens and pencils and related office supplies.
 Photographic accessories.
 Plumbers specialties.
 Pulp and paper.
 Sewing machines.
 Signs.
 Umbrellas and parasols.
 Ventilating fans.

Other products:

Other direct military products, manufacturing and construction equipment, components of products listed elsewhere and other construction materials.

Persons engaged in the following industries:
 Aeronautics training (civilian).
 Civil air patrol.

Commercial refrigeration and production of ice.

Construction.
 Engraving on metal (except for printing).
 Metal scrap salvage, sorting and processing of metal scrap.

Printing and publishing.

Public warehouses.

Radio communication and broadcasting.

Repair services for industrial and household equipment (motor and mechanical).

o o o

12**Warehouses, Distributors and Jobbers**

Aluminum. Each distributor shall, to the extent of his available stocks, fill authorized controlled material orders, except that a distributor shall reject any controlled material order calling for delivery at any one time to any one person, at any one destination, of more than 500 lb. (2000 lb. maximum) of any gage, alloy and size of aluminum sheet; or more than 300 lb. (1000 lb. maximum) of any alloy shape and size of aluminum, rod or bar; or more than 200 lb. (500 lb. maximum) of any alloy, size and shape of aluminum tubing, extrusion or structural shapes. Provided that, however, maximum quantities which may be filled at the election of the warehouse, if after asking the mill to supply the quantities, the mill directs the warehouse to fill the order from warehouse material.

A distributor may fill orders other than authorized controlled material orders, calling for delivery of 100 lb. of aluminum required for essential maintenance, repair or operating supplies, in a quarter provided he executes the MRO certification. (See Certification) (Reg. 4 (b))

Brass or wire mill. A warehouse may fill a purchase order, or an order bearing a preference rating of AA-5 or higher for brass mill or wire mill products from his stocks, provided that

The order does not require delivery of

more than 500 lb. copper or alloy weight, of any item to any one destination at any one time, and if the order is accompanied by or endorsed with a proper certificate.

No person who obtains any item of brass mill or wire mill products shall accept deliveries of the same item at any one destination aggregating more than 2000 lb. during any one calendar month, from warehouse stocks. (Reg. 4 (f))

The provision contained in CMP Reg. 4, restricting deliveries of brass mill products to 500 lb. copper or alloy weight of any item to any one destination, at any one time, shall not apply to deliveries of the following copper or copper base alloy items:

1. Condenser tubes.
2. A single straight length of rod, tube, pipe, sheet or strip.
3. Welding rod, delivered prior to April 1, 1943.

Orders for these items must be accompanied by, or endorsed with a certification. The 2000 lb. monthly limitation provided in paragraph (f) (2) of the regulation shall continue to apply to deliveries of such items. (Brass Mill Direction No. 1)

The provision contained in CMP Reg. 4, restricting deliveries of wire mill products to 500 lb. of copper or alloy weight of any item to any one destination, at any one time, shall not apply to deliveries of wire and cable sizes

40 and larger in reels not exceeding 1000 ft. each.

Order for such items must be accompanied by or endorsed with, the form of certification required. The 2000 lb. monthly limitation provided of CMP Reg. 4 shall continue to apply to deliveries of such items. (Wire Mill Direction 1)

General. A purchase order for steel, brass mill products, wire mill products or aluminum, shall be deemed an authorized controlled material order, if:

It is designated as an authorized controlled material order by any regulation or order of WPB; or

It is endorsed with the appropriate allotment number as required. (Reg. 4 (j))

Verbal delivery orders. Any delivery order requiring shipment within seven days may be placed verbally or by telephone by stating to the distributor or warehouse the substance of the information required by this regulation. Provided, that the person placing the order furnishes to the distributor or warehouse within seven days after placing the order, written confirmation of the order complying with the CMP requirements. In case of failure to receive written confirmation within seven days, the distributor shall not accept any other order from, or deliver any additional material of any kind to, the purchaser until the written confirmation is furnished. On or before the 15th day of each month, any distributor or warehouse who has received in the prior month an order by telephone, shall notify the WPB Compliance Division of any case in which a purchaser has failed to furnish to him the written confirmation when due.

Special provisions with respect to AAA orders. An authorized controlled material order placed with a distributor or warehouse, bearing a rating of AAA shall be filled in preference to any other authorized controlled material orders regardless of time of receipt. (Reg. 4 (k))

Steel. A distributor thinks that the filling of any authorized controlled material order would deplete his steel stock to a point where his function would be seriously impaired, may apply to the WPB for authority to reject an order. He may delay filling the order until the application is acted upon. (Reg. 4 (c) (1))

Restrictions, quantity. A distributor shall reject any authorized controlled material order calling for delivery at any one time, to any one person, at any one destination of 20 tons, or more, of steel unless such order includes 10 to more items—each item to be of a different quality, length, or cross-section, and no item of which shall weigh more than 4 net tons—or unless all items ordered consist of oil country tubing, casing or drill pipe. (Reg. 4 (c) (1))

Restrictions, quantity, miscellaneous. No distributor shall deliver steel after March 31 except to fill authorized material orders, but he may fill the following other orders:

1. Orders in amounts of \$10 or less;
2. Orders bearing preference ratings of AA-5 or higher on which delivery is made prior to July 1, 1943, subject, however, the same quantity with respect to deliveries on authorized controlled material orders;
3. Orders calling for delivery of carbon steel which are authorized under Food Production Order 3 of the Secretary of Agriculture;
4. Orders may be honored calling for delivery of not more than the following

amounts of each product classification and type indicated below, to the same customer, at the same destination, during any quarter:

(See table showing maximum amounts of each warehouse steel production which may be delivered during a calendar quarter to the same customer.)

Condensed Index of WPB Forms

Alloy orders, cold finished, under 10,000 lb.	WPB-2527
Aluminum-bronze products: producers' shipments, use, aluminum content, receipts,	WPB-1124
Aluminum:	
Cylinder heads, air cooled engines: producer's shipments	WPB-1330
Die castings: producer's shipments, production	WPB-48
Extrusions: producer's shipments, production	WPB-61
Forgings: CMP prime consumer's preference ratings, requirements, production,	WPB-2251
Forgings: producer's inventories,	WPB-2331
Forgings: producer's shipments, production	WPB-63
Impact extrusions: producer's shipments, production	WPB-65
Oxide: refractories producer's consumption, requirements, inventories,	WPB-2288
Permanent mold castings: producer's shipments, production	WPB-47
Powder, paste, flake and similar forms: producer's shipments and production,	WPB-687
Projects: request for expediting delivery of critical materials	WPB-2127
Rivets: producer's shipments	WPB-875
Rod, bar, wire (cable), structural shapes, rolled: producer's shipments, production,	WPB-60
Rotor castings for motors: producer's shipments, production	WPB-48
Sand castings: producer's shipments, production	WPB-46
Scrap: producer's production, inventories, shipments, consumption	WPB-317
Sheet: producer's shipments, production,	WPB-59
Tubing: producer's shipments, production,	WPB-62
Castings, iron, non-assembled (except oil country pipe and fittings): owner's idle and excessive inventories	WPB-2193
Chucks and accessories: producer's shipments and orders	WPB-2057
Contracts, all: location of manufacture,	WPB-1849
Copper wire, cable: owner's idle and excessive inventories	WPB-2019
Copper and copper-base alloys, non-assembled partially or wholly fabricated forms: owner's idle and excessive inventories,	WPB-843B
Copper and copper-base alloys, primary forms: owner's idle and excessive inventories	WPB-843A
Cutting tools: manufacturer's shipments, orders, inventory	WPB-39
Forgings, non-assembled, steel carbon, semi-finished primary forms: owner's idle and excessive inventories	WPB-1865
High alloy steel castings, non-assembled (corrosion-resistant and heat-resistant): owner's idle and excessive inventories,	WPB-1864
Iron castings, non-assembled (except oil country pipe and fittings): owner's idle and excessive inventories	WPB-2193
Iron oxide pigments, manufactured: producer's sales	WPB-1063
Iron, wrought, non-assembled, partially or wholly fabricated (except oil country pipe and fittings): owner's idle and excessive inventories	WPB-2194B
Iron, wrought, primary forms (excepting oil country pipe and fittings): owner's idle and excessive inventories	WPB-2194A
Low alloy steel castings, non-assembled: owner's idle and excessive inventories,	WPB-1863
Machines, critical: available capacity,	WPB-788
Machine tools, aluminum or magnesium facilities: consumer's requirements, preference ratings	WPB-1070
Machine tools: producer's employment, production, plant expansion	WPB-416
Machine tools: producer's pool order data sheet	WPB-2225

Provided, that each order placed shall be accompanied by or endorsed with a certificate.

5. No person who obtains any steel shall obtain steel from any sources in the same calendar quarter in amounts aggregating more than the amounts therein specified. (Reg. 4 (c))

Machine tools: producer's schedule of shipments	WPB-1588
Machine tools, producer's shipments, order,	WPB-417
Machine tools: producer's status of specific machine	WPB-2389
Manufacturing: application for financial assistance	SWPC-1
Manufacturing: contracts, subcontracts, plant capacity, employment	WPB-1546
Manufacturing, all: employment sales,	WPB-2282
Manufacturing, all: location of manufacture	WPB-1849
Manufacturing, all: producer's shipments, preference ratings, unfilled orders, employment	WPB-732
Metal forming and shaping machine: producer's orders and shipments	WPB-1440
Nickel scrap; owner's willingness to sell,	WPB-2037
Non-ferrous scrap: dealer's standard bid form	WPB-681
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Pipe and tubing products, steel, carbon, non-assembled partially or wholly fabricated: owner's idle and excessive inventories,	WPB-1860B
Pipe and tubing, steel, carbon: owner's idle and excessive inventories	WPB-1860A
Plant facilities record: contracts, subcontract, plant capacity, employment,	WPB-1546
Plant inspection report: employment sales,	WPB-2282
Plant operation report, metals, non-ferrous: mines, mills, smelters and refiners employment	WPB-732D
Plant operation report: producer's shipments, preference ratings, unfilled orders, employment	WPB-732
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PRIORITIES

Current "E" Orders

To regulate the flow and distribution of Machine Tools and Cutting Tools

Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued Effects
E-1-b	Amended	Machine tools	Allocates 75% of monthly production to service purchasers, 25% to foreign and others, subject to certain provisions, determines sequence of deliveries.	1A, 3A, 311, 408, 669, 670, 671.	3-8
E-1-c		Machine tools for Canadian purchasers.	Raises any assigned rating covering machine tools to be purchased by Canadians as defined "as other purchasers" in order E-1-b to A-1-a.		6-19
E-2-b	Amended	Cutting tools	Provides for scheduling of total monthly production, restricts sales and purchases to orders rated A-9 or higher, subject to specific exceptions; provides for allocation of capacity in emergencies.		12-12
E-4		Second hand machine tools	Allocates and directs distribution		2-3
E-5		Gages, precision measuring tools, testing instruments and chucks.	Revokes E-1-a revised. Sales and deliveries restricted to orders with A-10 or higher rating.		6-13
E-5-a	Supersedes E-5 on 5-1-43.	Gages and precision measuring hand tools.	Controls production, sale and distribution		3-28
E-6	Combined print, 10-29-42.	Hand service tools	Limits the type of steel which may be used in producing such tools and also limits the orders which producers may fill.		6-12
E-7	Amended	Metal-cutting band saw blades and hacksaw blades.	Restricts sale and purchase of metal-cutting band saw blades to orders rated A-9 or higher; restricts sale and purchase of hacksaw blades to rating of A-9 or higher, subject to certain exceptions; permits sale of low alloy steel hacksaw blades used in ordinary hand frames without preference ratings.		10-4
E-9		Precision measuring instruments and testing machines.	Restricts sales and purchases to A-1-a or better rated orders on prescribed forms; permits sale and delivery of repair parts; permits filing of schedules; supersedes similar provisions of E-1-b and E-5.	1A, 3A, 4X, 4Y, 408, 669, 670.	3-14

Current "L" Orders

Restricting Material Use

Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued Effects
L-1-e	Amended	Motor trucks, truck trailers, passenger carriers.	Stops production on cut-off date but permits completion of February and March quotas; permits manufacture beginning 7-1-42 of the off-the-highway vehicles as specifically authorized; authorizes producers to schedule production of vehicles as if orders therefor have AA-2X rating.		3-13
L-1-g	Amended	Motor trucks, truck trailers and passenger carriers.	From 7-1-42, prohibits production except for war agency orders.		1-6
L-1-h	Amended	Motor truck, truck trailers, passenger carriers.	Establishes heavy truck production quotas for specific manufactures	571	1-7
L-2-g		Passenger automobiles	Stops production after cut-off date but allows completion of January quotas by 2-10-42.		1-20
L-2-i		Passenger automobiles	Restricts transfer of inventories of standard steel except to holders of A-3 rating and of alloy steel except to holders of A-1-k rating.		3-6
L-3-f		Light motor trucks	Stops production 2-1-42 except that producers may apply for permission to complete January 1942, quotas not later than 2-10-42.		1-21
L-5	Combined print, 9-30-42.	Domestic mechanical refrigerators.	1. Production restricted during limitation period		9-30
L-5-c	Combined print, 9-30-42.	Domestic mechanical refrigerators.	2. Regulates inventories of materials, parts and refrigerators.		2-23
L-5-d	Amended corrected copy.	Domestic mechanical refrigerators.	3. Curtails production during limitation period. Prohibits production from cut-off date; permits limited production of kerosene refrigerators after 4-30-42.	500	12-5
L-7-c		Domestic ice refrigerators	1. From effective date stops transfers subject to designated exceptions	427, 431	11-14
L-13-a	Amended	Metal office furniture and equipment.	2. Establishes procedure covering application for permission to purchase and issuance of certificates of transfer.		8-5
L-22-a		Furnaces	3. Directs that shipments be reported.		1-75
L-38		Industrial and commercial refrigeration and air-conditioning machinery and equipment.	Limits iron and steel "content" to six pounds, ice capacity to 50 and 75 pounds after 1-1-43; restricts manufacture to persons specified in schedule.	500, 531, 655	12-14
	Amendment 1		1. Consolidates all amendments into the amended order.	423, 500	5-15
	Amendment 2		2. Stops manufacture from 5-31-42 of Group 2 products with specified exceptions.		6-18
	Amendment 3		3. Stops manufacture from 8-5-42 of Group 1 products with specified exceptions.		7-3
	Amendment 4		4. Prohibits transactions in Group 1 and Group 2 products with specified exceptions.		7-10
	Amended		From 12-31-42, prohibits manufacture of steel furnaces except as authorized for military purposes on PD-704. Limits production of spare parts.	704	9-26
			1. Subject to specified exceptions stops sales to consumers	1A, 520	4-14
			2. Restricts production during limitation period and thereafter.		4-89
			3. Prohibits production of specified items for 90 days subject to specified exceptions.		4-14
			1. Revises definition of "Preference order," and defines "Fabricated part" and "Emergency Repair Service."		4-14
			2. Excepts emergency repair service from restrictions on delivery of materials.		4-14
			Prohibits sale or other disposition of self-contained water coolers except to government agencies or to manufacturers specifically authorized.		4-14
			Defines "other authorized channel of distribution"		4-14
			Further restricts production of non-essential equipment and releases from dealer, distributor and producer certain items.		4-14
			Revises "authorized order" to include those received by 4-6-43 rated A-1-c or better.	830, 831	4-14

PRIORITIES

Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued— Effective
42	Reprint, 9-30-42	Plumbing and heating simplification.	Announces that schedules of simplification of lines designed to conserve critical materials and productive facilities may be issued from time to time.	500	2-11-42
Issues Effect	Schedule II	Revoked.			3-7-42
	Schedule III	Low pressure heating boilers.	Orders elimination from boilers of metal jackets, fusible plugs, and tricocks after 6-1-42 subject to specified exceptions. Stops production of metal jackets 3-16-42 subject to exceptions specified.		6-1-42
60, 3-8	Schedule IV amended.	Cast-iron soil pipe and fittings.	Stops production and transfer of any pipe and fittings not conforming to standards.		4-13-42
					6-1-42
6-19	Amendment I		Prohibits coating cast iron soil pipe.		9-24-42
	Schedule V	Plumbing fixture fittings and trim.	Restricts use of metal in production subject to exceptions specified. Establishes standards to govern all production subject to designated exceptions.	500	3-23-42
12-19	Amendment I	Plumbing and heating	Except for articles already in production, stops use of chromium, nickel, copper, or cadmium as finish on fittings or trim.		4-1-42
					5-6-42
2-4	Schedule V-a amended.		Prohibits use of copper or copper base alloy in designated articles subject to exceptions.	500	1-23-43
6-15	Schedule VI	Cast iron tubular radiators...	Restricts production and transfer subject to specified exceptions.		3-30-42
					4-16-42
3-26	Schedule VIII	Vapor and vacuum heating specialties.	Restricts production and transfer subject to specified exceptions of specialties conforming to standards set to schedule.		4-25-42
6-12	Schedule X	Electric pumps and/or electric cellar drainers.	1. Eliminates use of brass, copper, and copper-base alloys in specified parts.		5-29-42
10-4			2. From 6-16-42 prohibits delivery or acceptance of delivery of products not following restrictions, with designated exceptions.		
			3. Requires producers to keep inventory records of excepted products.		
108, 3-16	Schedule XII amended.	Plumbing fixtures	1. Restricts use of metal in production subject to designated exceptions.	423, 500, 727	2-20-43
			2. Establishes maximum quantities of iron and steel to be used in production of specified fixtures.		
			3. From 6-20-42 stops production and transfer unless conform to specified standards.		
L-51		Track-laying tractors and auxiliary equipment.	1. Prohibits transfer of unused equipment to any except other producers, dealers or other authorized channels of distribution subject to designated exceptions.		2-19-42
			2. Does not apply to transfers under conditional sales contracts entered into before effective date of order.		2-15-42
	Amendment 1		1. Further restricts deliveries		6-15-42
			2. Permits sale only of auxiliary equipment to be mounted on a specific tractor in the possession of an ultimate consumer.		
L-51-a		Track-laying tractors	1. During limitation period sets maximum production quotas of designated models for four producers.		4-9-42
			2. Stops production of designated and similar models from cut-off date.		
Issues Effect	L-53-b	Amended	Limits sales by producers, domestic dealers and distributors, establishes order placing procedure; requires return of used repair parts subject to certain exceptions.	556	3-20-43
3-13	L-39	Metal plastering bases and accessories.	Restricts use of any metal in production during limitation period.	500	3-25-42
1-6	Amendment 1		Strikes out subparagraph (4) of paragraph (b), eliminating authorization to supply Government agencies and departments.		5-16-42
1-7	Amendment 2		1. From 7-1-42 to 10-31-42 prohibits manufacture in excess of 1/6 of 10 percent of metal used during years 1940 and 1941.		7-11-42
1-23			2. Holds companies using more than 14,000 tons of metal during 1941 to 10 percent of their average use of iron and steel and 25 percent of zinc in 1940 and 1941; small companies may use 50 percent of their average use of iron and steel and 35 percent of zinc.		
3-4			3. Provides for adjustments for companies not in operation during entire year of 1940.		
1-21	L-38-b	Metal plastering bases and metal plastering accessories.	From 11-16-42 prohibits manufacture except for government agencies	500	11-13-42
9-30	Amended		Liberalizes restrictions on manufacture of base; permits transfer of bases or accessories in inventory prior to 4-2-43; clarifies restrictions on accessories.	500	4-2-43
2-23	L-43	Amended	Restricts inventories of supplies held by wholesalers, jobbers, dealers, retailers, or branch warehouses.	1X, 336	2-10-43
12-5	L-40	Closures and associated items.	From 4-1-42 restricts the use of critical materials in manufacture.		3-28-42
L-40	L-74	Oil burners	1. Restricts production of Class A burners.	500	4-15-42
11-14			2. During limitation period restricts production of Class B burners.		
			3. After cut-off date stops production of Class B burners.		
5-5	Amendment 1		1. Further defines "Class A" Oil Burners.		6-4-42
			2. Defines a "Class B" Oil Burner as any other than a "Class A" Oil Burner.		
L-75	Amended	Coal stokers	From November 4, restricts delivery, and requires filing of production and delivery schedule of Class A stokers. Orders may be placed for Class A stokers only on authorization with PD-668. Exempts Army, Navy, Maritime Commission or War Shipping Administration from restrictions until 11-23-42.	500, 668	10-20-42
12-14	L-79	Amended	Metal plumbing equipment and metal heating equipment.	423, 500	12-16-42
5-15					5-23-42
L-43	Amended	Industrial machinery	1. Restricts transactions to "approved orders" with specified exceptions	1A, 3A, 200, 408, 500	3-12-43
6-18			2. Establishes procedure for authorization of orders on books.		
			3. Regulates auction sales, court order sales, and similar transactions.		
			4. Does not apply to repair or maintenance orders of less than \$1,000.		
7-3	Interpretation 1		Rules that value of machinery sold while in need of repair includes cost of repairs added to original selling price.		12-17-42
L-88		Used rail and used rail joints.	Places disposition under control of Director of Industry Operations	447	4-22-42
7-10	Amendment 1		1. Does not include high T rails from street car tracks.		5-18-42
9-26			2. Permits transfer of ten tons of used rail per month.		
L-89	Amended	Elevators	1. Prohibits acceptance of any restricted orders or start of manufacture except as authorized.	411, 562	1-27-43
4-14			2. Restricts use of nonferrous metals, stainless or alloy steel.		

PRIORITIES

Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued Effect	Order No.
L-91	Amended	Laundry equipment, dry cleaning equipment and tailor's pressing machinery.	1. Prohibits sale or delivery of new or reconditioned machinery in excess of \$100 value except for war agencies as specified or upon authorization of Form PD-418. 2. Prohibits manufacture of machinery except for similar purposes. 3. Permits repair of existing machinery. 4. Prohibits use of specified materials except as required by war agencies.	418, 419, 500	3-12	L-134
L-97	Amended	Railroad equipment	Establishes control over transfer, repair, or other disposition of used locomotives, in addition to restrictions on production and delivery of original order.	747	1-1	L-140
	Interpretation 1		Defines "dismantle" to mean removal or stripping usable parts from locomotive for re-use on other locomotives; "scrap" to mean to reduce entire locomotive to scrap material without removing parts for re-use.		2-18	
	Interpretation 2	Railroad equipment	Rules on precedence of preference ratings in regard to production and delivery schedules.		4-12	
L-97-a		Railroad equipment: cars.	Puts production schedules under control of Director of Industry Operations.	599	4-4	L-142
L-97-a-1	Amended	Railroad equipment	1. Cancels preference ratings of A-2 or lower assigned prior to 4-29-42. 2. Authorizes transfer of parts for repair or construction of cars or locomotives.		2-24	L-144
L-97-b		Railroad equipment	Establishes control of production and distribution of industrial cars of railroad type.	599	8-4	
L-100		Compressors	Puts placing and acceptance of orders for critical compressors under control of Director of Industry Operations.	415, 416	4-12	L-145
L-101	Amended	Passenger carriers	From effective date puts production schedules and transfers under control of Director of Industry Operations.	530, 530A	2-4	
L-106	Amended	Copper	Stops the use of copper in production of automotive parts other than as specified.		3-4	
L-107		Extended-surface heating equipment.	1. Delivery prohibited except on U. S. Government orders or as authorized on Form PD-412-A by the Director of Industry Operations or if in transit on effective date of order. 2. Order does not affect delivery of spare-part electric motors, or controls, or repaired heat-transfer elements.	412A	6-13	L-147
L-108		Finishes on metal working equipment.	After 4-30-42 restricts painting equipment and parts or assemblies except by ultimate purchasers.		4-23	
L-110		Electroplating and anodizing equipment.	1. Restricts production for and transfers to holders of A-1-i rating or higher	1A	5-14	
			2. Establishes criteria for issuance of preference rating certificates.			
L-111		Hand trucks	Restricts and regulates the delivery of hand trucks equipped with rubber tires and of rubber tires for hand trucks.		5-2	
	Amended	Hand trucks, other handling equipment.	Limits acceptance of orders to those rated AA-5 or higher, except for repair parts; establishes production specifications and certification procedures.	845	4-13	L-157
L-112	Amended	Industrial power trucks	1. Places all production under complete scheduling 2. Prohibits manufacturers from accepting prior to 10-15-42, orders except those rated A-9 or better, and after that date, orders except those specifically authorized by the Director General of Operations. 3. Requires filing prior to 10-15-42, and thereafter monthly, proposed 3 month production schedule and 1 month delivery schedule on PD-385.	385, 556	9-28	
L-112-a	Amended	Industrial power trucks	Lists manufacturers and approved standard models permitted to be manufactured by each.		11-10	
L-117	Amended	Heavy power and steam equipment.	Prohibits production or transfer except to fill an approved order as specified subject to designated exceptions.	1A, 200, 665	11-2	
L-123	Amended	General industrial equipment.	Prohibits acceptance of order or delivery in fulfillment of order, unless order is approved order as defined.		2-23	
	Corrected copy.		Further defines "delivery"		6-13	
	Interpretation 1		Clarifies several statements of original order		12-14	
	Interpretation 2				7-3	
L-126		Industrial and commercial refrigeration and air conditioning machinery and equipment.	Prohibits related machinery from production except as authorized and to required specifications as set forth in schedules.			L-158
	Schedule I Amended	Water drinking coolers	Establishes production specification on types, sizes, capacities and materials		3-27	
	Schedule II Amended	Refrigeration condensing units.	Establishes production specifications on types, sizes and materials		3-27	L-159
	Schedule III Amended	Coil or tube assemblies for refrigeration condensers or coolers.	Establishes production specifications according to use		3-27	
	Schedule IV	Refrigeration valves, fittings, accessories, and other parts.	Establishes production specifications on use of metal		3-27	L-170
	Schedule V	Commercial reach-in and walk-in (prefabricated sec- tional) refrigerators.	Establishes production specifications on sizes and use of metal		3-27	
	Schedule VI	Refrigerant and service con- nections.	Establishes production specifications for use of metal		3-27	L-170-a
					4-6	
L-128		Chromium and nickel in auto- motive valves.	1. Limits use of chromium and nickel to specified percentages. 2. Prohibits manufacture of any but two-piece welded head type. 3. Prohibits sale of new valves to replace ones that can be reconditioned and requires consumers to turn in used valve for each new one purchased. 4. Prohibits sale for use as replacement in passenger cars or light trucks, of valves manufactured for other categories. 5. Restricts distributors' inventory of valves.		6-17	L-172
			Exempts war agencies		7-1	L-182
	Amendment 1				7-4	
L-134	Amended	Instruments, valves, and reg- ulators used in industrial processes.	1. Prohibits use of chromium, nickel or alloy thereof in production of specified instrument parts except for use under specified operating conditions. 2. Exempts items sold to another manufacturer or dealer for resale or items for use in foreign country (except Canada). 3. Prohibits delivery or acceptance of delivery. 4. Provides specifications for instrument parts affected.		1-30	L-187
	Corrected copy.					

PRIORITIES

Issued Effective	Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued— Effective
3-12-42	L-104	(Continued)		5. Requires preference rating of A-1-c or better for acceptance of order or delivery, with specified exceptions, and requires installation of such items within 90 days. 6. Requires certification with specified exceptions. 7. Exempts instrument parts to be used exclusively on U. S. Army or Navy vessels. 8. Affords 90-day exemption from provisions of the order to deliveries for Army, Navy or Maritime Commission.		
1-1-43	L-140		Cutlery	1. Limits quantity of iron, steel and other metals used for cutlery		5-30-42
2-15-42				2. Prohibits accumulation of inventories beyond specified amount of raw materials and parts.		
4-15-42		Amendment 1		Removes cutlery in classes 1, 2, 3 and 4 from restrictions of the order if produced for the Army, Navy, Maritime Commission, or War Shipping Administration. Exemption does not apply to cutlery purchased by Post Exchanges, etc.		8-25-42
4-4-42	L-142		Metal doors, metal door frames and metal shutters.	Limits non-essential production, but permits manufacture of airplane hangar doors and of metal clad fire doors if the metal covering does not exceed 24-gauge.	500	9-15-42
2-24-42	L-144	Amended	Laboratory equipment	1. Prohibits sale or rent of laboratory equipment containing specified materials unless under certification as provided in Priorities Regulation No. 7. 2. Limits such certification to research involving public health and for specified agencies of the Government.	620	9-16-42 3-24-43
4-17-42	L-145		Aircraft control and pulley bearings.	1. From 6-10-42 prohibits manufacture of specified sizes except by "Authorized Producers" as defined. 2. Permits delivery of bearings completed on 6-10-42. 3. Requires manufacturers to retain tools and equipment.		6-8-42 6-10-42
3-4-42		Amendment 1		1. Qualifies "completed bearings" to include wholly or partially completed bearings. 2. Indicates changes in producers in exhibit A.		7-7-42
6-15-42	L-147		Machine tools electrical specifications.	1. Prohibits special electrical specifications for machine tools except in specified circumstances. 2. Requires purchasers to avoid special electrical specifications from 7-15-42.		7-10-42
4-22-42	L-149		Power, steam, and water auxiliary equipment.	Prohibits production of power, steam, and water auxiliary equipment except in accordance with schedules.		6-17-42
5-11-42		Schedule 1	Water meters	Prohibits production of water meters containing copper or copper base alloys, stainless steel or nickel alloys, or tin in coatings.		6-17-42
5-7-42		Amendment 1		1. Exempts production for war agencies. 2. After 7-21-42 permits assembly of meters from parts and materials on hand 7-1-42.		7-24-42
4-13-42	L-157	Schedule 2	Steam surface condensers	Restricts use of materials in steam surface condensers		8-14-42
9-28-42		Schedule 1	Hand tools simplification	Prohibits manufacture except in accordance with specifications in schedules	500	7-20-42
		Amended	Hand shovels, spades, scoops, or telegraph spoons.	Establishes sizes, types, grades, finishes, lifts, gauges, and handles for manufacture.		10-20-42
11-10-42		Schedule II	Forged axes, forged hatchets, forged adzes and forged light hammers.	1. Establishes specifications permitted in manufacture of these tools. 2. From 60 days subsequent to issuance date, nonconforming tools may not be manufactured, and from 45 days subsequent to issuance date, no nonconforming ferrous tool may be put in process. 3. Permits sale of such tools manufactured prior to expiration of 60 days from issuance date, even though they do not conform to these specifications.		3-23-43
11-24-42		Amended	Manually operated wood and special purpose saws.	1. Establishes specifications permitted in manufacture of these tools. 2. Requires all such tools put in process from 30 days subsequent to issuance date to conform, and from 90 days subsequent to issuance date, prohibits manufacture of nonconforming tools. 3. Permits sale of saws fabricated prior to 90 days from issuance date.		12-21-42
2-27-43		Schedule IV	Heavy forged tools	Controls and limits production and types permitted. Specifications in Appendix A.		2-25-43
6-13-42		Schedule IV Amended		Amends Table 6 of Appendix A		4-9-43
12-14-42		Schedule V	Hand forks, hand hooks, hand rakes, hand hoes, hand eye hoes and hand cultivators.	Specifies kinds, grades, styles, sizes, weights and finishes to be manufactured.		1-9-43 4-9-43
3-27-43	L-158	Amended	Motor vehicle replacement parts.	Limits production to specified items and standards; restricts consumer sales; restricts distributors inventories; establishes certification procedures; establishes exceptions to restrictions.		3-11-43
4-6-43	L-159	Amended	Plastics molding machinery	Establishes allocation control and application procedure; restricts manufacture, delivery and acceptance of repair parts.	741	3-26-43
4-6-43		Amended		Eliminates used fixtures; adds exemptions; revokes par. (b) (3)		4-14-43
4-6-43	L-163		Turbo-blowers	Restricts placing of orders and delivery except as specifically authorized. Redefines the original definition to include smaller machines not previously covered.	616, 616B	8-7-42 9-18-42
3-27-43	L-170	Amended	Farm equipment	Revokes and supersedes as cf 11-1-42, Order L-26, L-26-a, L-26-d, with all amendments and appeals. Restricts production both for domestic and export use, restricts metal in specified products, controls sale and inventories, sets up simplification, substitution and critical materials conservation procedures.	387, 630, 757, 759	3-6-43
3-27-43	L-170-a		Farm machinery and equipment and attachments and repair parts therefor.	Restricts use of copper or copper-base alloy products used in farm tractors, engine power units, and repair parts therefor, to 15 specified items.		11-7-42
6-17-42	L-172	Amended	Heat exchangers	Prohibits placing or accepting orders for heat exchangers except as specified	615, 615B	11-2-42
7-14-42	L-182	Amended	Commercial cooking and food and plate warming equipment.	From 10-1-42, restricts use of iron and steel in manufacture to 25% of iron and steel used during calendar year 1941 and restricts delivery.	638, 638A	3-2-43
7-4-42	L-185		Water heaters	Prohibits manufacture of direct fired water heaters using gas or oil, solar water heaters, limits weight of metal used in direct fired water heaters using coal or wood and in indirect water heaters. Prohibits manufacture of metal jackets, limits use of copper or copper base alloys and other metals in manufacture or repairs.	500, 725, 726	12-19-42
1-30-43		Interpretation 1		Clarifies meaning of term "water heater"		1-11-43
	L-187	Amended	Low pressure cast iron boilers	Prohibits manufacture for exclusive gas or oil use; prohibits manufacture of all other types except for military or hospital use; permits replacement part manufacture.	639, 704	2-13-43

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Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issue Effect	Order No.
L-190		Scales, balances, and weights.	Restricts production, transfer, production of repair and maintenance parts, types, sizes and materials affecting four specified types.		10-10	L-226
	Interpretation 1.		Redefines "class one scales"		11-23	L-229
	Interpretation 2.		Redefines "Class One" and "Class Three" scales.		1-11	
L-192	Amended	Construction machinery and equipment.	Restricts sale, production, use, resale, rental; restricts sale and delivery of repair parts. Supersedes L-82, L-82-a.	556, 697	11-17	L-217
L-193	Amended Corrected copy.	Conveying machinery and mechanical power transmission equipment.	Restricts placing and acceptance of orders, manufacture and delivery, establishes procedure for obtaining authorization and monthly scheduling.	681, 682	1-21	L-218
	Amended	Conveying machinery, mechanical power transmission equipment.	Amends Schedule A.		4-3	L-220
L-196	Amended	Used construction equipment.	1. Requires registration of construction equipment within 30 days of issuance of order. 2. Requires notification of any change in status of such equipment. 3. Lists construction equipment items affected in Schedule "A".	556	1-4	
L-197	Amended	Steel shipping drums	Prohibits use of new or used drums for packing any product not so packed previous to issuance date of order, and lists products which may not be packed in drums from 60 days after date of issuance; requires all drums manufactured on and after 10-1-42 to bear letter "X" embossed on bottom plate.	717	1-25	L-282 L-283
L-199		Plumbing and heating tanks.	Prohibits manufacture of metal tank supports or jackets. Prohibits use of copper and copper base alloy and limits weight of metal used. Provides simplification schedule. Specific exceptions are provided.	500, 725, 726	12-18	L-284
	Interpretation 1.		Permits transfer of heaters in which tanks made of specified metals were installed prior to 12-19-42.		1-26	L-282
L-201	Amended	Automotive tire chains and chain parts.	Limits production of automotive tire chains, prohibits metallic plating, restricts sizes and types.		12-4	L-288
L-203		Combat measuring instruments.	Restricts acceptance and delivery of orders except as specified and authorized; requires application on PD-674 and manufacturer's report on PD-675 and PD-676.	674, 675, 676	10-14	
L-211		National emergency specifications for steel products.	Empowers Director General of Operations to establish sizes, shapes, specifications and other qualifications of steel products, to which all producers must conform.		10-24	L-269 L-272
	Schedule 1.	Concrete reinforcement steel.	Establishes specifications and restricts sizes and shapes.		10-24	
	Schedule 2.	Steel wheels and tires.	Establishes specifications and restricts sizes and shapes.		10-24	
	Schedule 3.	Barbed wire, wire fence, poultry netting and flooring.	Establishes styles and specifications to which all such products must conform.		3-34	
	Schedule 3 Amended.	Barbed wire, etc.	Amends "wire netting" of List 1.		3-34	L-273
	Schedule 4.	Structural steel shapes.	Restricts sizes, shapes, specification, subject to general exceptions.		2-25	L-280
	Schedule 5.	Steel axles and forgings (railroad and transit service).	Restricts sizes and shapes by specification, subject to designated exceptions.		2-25	
	Schedule 6.	Mechanical steel tubing.	Restricts production by quantities, sizes, and specifications subject to specific exceptions.		2-25	
	Schedule 7.	Rails and track accessories.	Restricts production, fabrication delivery and acceptance to specifications in List 1 of schedule.		2-25	
	Schedule 8.	Carbon steel plates.	Limits production, delivery and acceptance of delivery to those conforming to List 1 or 2 specifications, subject to certain provisions.		3-23	
L-216		Simplification and standardization of portable tools, chucking, equipment, mechanics' hand service tools, files, hack and band saws, vises, machine tools accessories.	Provides for issuance of schedules establishing standardization and simplification and establishing preference ratings for sales of these products.		12-4	
	Schedule I.		Establishes simplification standards and specifications.		12-4	M-1-h
L-217	Amended	Construction machinery and equipment simplification and conservation.	Provides for issuance of simplification schedules for construction machinery and equipment.		3-3	M-1-i
	Schedule I.	Scrapers.	Restricts use of alloy steel for scrapers. Exempts certain power control units, prime movers, and anti-friction bearings.		11-17	M-2-b
	Schedule II.	Portable jaw and roll crushers.	Number of sizes reduced jaw crushers from 63 to 29; roll crushers from 25 to 5.	697	2-5	M-3-a
	Schedule III.	Angle dozers or trailbuilders.	Prohibits use of alloy steel for production or assembly and repair parts except of that in inventory or in transit; not applicable to power control units, prime movers, or anti-friction bearings.		1-23	M-3-b
	Schedule IV.	Bulldozers.	Prohibits use of alloy steel for production or assembly and repair parts except of that in inventory or in transit; not applicable to power control units, prime movers, or anti-friction bearings.		1-23	M-3-c
	Schedule V.	Portable construction concrete mixers.	Limits production to specified sizes and types; applies to running gear, accessories, attachments, painting, mudguards.	697	2-25	M-3-a
	Schedule VI.	Truck mixer agitators.	Limits production to specified sizes and types; applies to painting, attachments.	697	2-25	M-3-b
	Schedule VII.	Pumps.	Limits production and assembly by sizes and types; applies to painting and accessories.	697	3-15	M-3-b
	Amended.				3-20	
L-221	Amended	Electrical motors and generators.	Restricts purchase and sale of electric motors and generators. Restricts types of motors manufactured to stated specifications and schedules production with PD-738.	738	1-15	M-3-c
L-222	Amended	Floor finishing and floor maintenance machines and industrial vacuum cleaners.	Limits and finally prohibits production; permits limited production repair parts; restricts transfers; permits D. G. O. to authorize special quotas for machines, repair parts, supplies.	722, 723	3-14	M-3-c
L-223		Hard-facing materials.	Restricts delivery of hard-facing material to preference rated orders AA-5 or higher, restricts inventories.	733, 734, 735	12-24	M-3-c
L-225		Electrical conduit, electrical metallic tubing and raceways.	Restricts production and installation of rigid and flexible conduit tubing and raceways with specified exceptions.	500	12-10	M-3-c

PRIORITIES

Issue Effective	Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued—Effective
10-10-42	L-28	Amended	Printing and publishing machinery, parts, and supplies.	Restricts acceptance of orders, auction sales production, and sales.	260, 500, 556	2-10-43
11-23-42	L-29		Replacement parts for electric railway cars and trolley coaches.	Restricts material and production of replacement parts, restricts replacements and inventories by carriers.	500	12-11-42
1-21-43	L-37		Woodworking machinery and light machine tools.	Restricts distribution and production light power-driven tools.		2-2-43
4-3-43	L-38		Commercial dishwashers.	Restricts use of metal in manufacture, restricts delivery, acceptance, delivery of replacement parts; establishes simplified practices.	638, 638A	3-2-43
1-4-43	L-39		Electric motor controllers.	1. Requires rating of AA-5 for manufacture; 2. Requires wiring to follow shortest route consistent with mechanical, electrical design; use of No. 14 A. W. G. or smaller wires; smallest possible size fuses, connecting straps, terminals; use of one color control circuit wiring insulation between terminals; 3. Prohibits inclusion of control circuit fuses or disconnect switch or control transformer for single motor rated less than 600 volts.		2-13-43
1-2-43	L-40	Amended	Valves and valve parts.	Establishes specifications of size and material for production, subject to specific use exceptions.		3-2-43
1-2-43	L-41	Corrected copy	Motor truck and trailer bodies.	Limits use of iron and steel in construction; limits dimensions and weights of dump bodies; prohibits production of tank bodies except as authorized.	702	5-1-43
12-10-42	L-42		Internal combustion air-cooled engines.	From 3-15-43, subject to specified exceptions, stops production of all engines except basic models according to Schedule A and of parts that do not conform to specifications in Schedule B.		2-10-43
1-2-43	L-43		Aircraft.	Puts transfers subject to specified exceptions of single-engined aircraft of 500 horsepower or less, and of Link trainers under control of Director General for Operations.		3-4-43
12-4-42	L-44		Oxy-acetylene apparatus.	Restricts delivery and acceptance to AA-5 or better rated orders, subject to certain conditions; restricts manufacture, sales, repairs, inventories; permits allocation of production; effective 3-6-43.		1-26-43
10-13-42	L-45		Mining equipment.	Establishes control of production and delivery of items in List A attached.	815	2-24-43
10-20-42	L-46		Industrial type instruments, control valves and regulators; simplification.	Permits establishment of simplification schedules regarding sizes, forms, specifications, composition, or other qualifications.		3-11-43
10-24-42	L-47	Schedule I	Control valves.	Establishes specifications of size, forms and composition.		2-22-43
10-24-42	L-48	Schedule II	Liquid level controllers.	Specifies size of equalizing connections.		2-22-43
3-31-43	L-49		Busways.	Restricts acceptance and delivery of orders after 4-15-43 to those rated AA-5 or higher; restricts mechanical and electrical design, subject to certain exemptions.	834	2-25-43
2-25-43	L-50		Fans and blowers.	Prohibits acceptance of orders after 2-23-43, delivery after 3-31-43, unless orders are approved: excepts repair parts not exceeding \$500 for single fan, blower, or 50% original sales price and repair of actual breakdown.	795, 796	2-16-43

Current "M" Orders

Regulating use of the Critical Materials

Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued—Effective
M-1-d	Amended	Aluminum scrap.	Restricts use, segregation, contamination, sale and delivery; prohibits unauthorized tolling; establishes certification procedure.	249, 272, 706, 828	3-16-43
12-4-42	M-1-h	Aluminum.	Allocates supply of alumina and bauxite.	567, 568	7-7-42
2-5-43	M-1-i	Aluminum.	Establishes allocation procedure; specifies requirements relative to placing orders and acceptance of orders by producers, smelters and fabricators; establishes list of eligible items, provides temporary exception for military items; regulates dead stock and tolling.	114	3-10-43
11-17-42	M-2-b	Magnesium.	Establishes allocation control.	See "purpose" column.	12-31-42
2-5-43	M-3-a	Nickel	PD Forms: 26M, 40M, 114, 174, 786, 787, 788.	27, 27A, 27B, 707	3-10-42
1-23-43	M-3-b	Nickel	Restricts delivery and acceptance to authorized amounts.		3-30-42
2-1-43	M-3-c	Nickel	Restricts use except when authorized or for implements of war or articles or products for specified government agencies; limits inventories; appends List A of prohibited uses.	556	10-3-42
1-23-43	M-3-d	Nickel scrap and secondary nickel.	Regulates deliveries, melting, toll agreements segregation.	394	6-19-42
2-25-43	M-3-e	Copper base and copper base alloys.	Establishes allocation control, and restricts delivery and acceptance of copper and deliveries of brass mill or wire mill products, deliveries of foundry products or copper base alloy ingots, and toll agreements.	59, 59A, 59D, 123, 743	3-4-43
3-15-43	M-3-f	Copper scrap and copper base alloys scrap.	Restricts delivery or acceptance and melting or processing of scrap or alloy ingots; delivery to or acceptance by foundries and makers of alloy ingots; disposal of scrap, toll agreements; and acceptance of copper-base alloys or castings, including alloy ingots.	59, 59A, 59B, 226, 226B, 249, 743, 751	3-11-43
1-15-43	M-3-g	Copper	Restricts use with governing dates, and prohibits use in manufacture of specified items.	426, 500	2-26-43
3-1-43	Amendment 1		Amends listing of dishwashing machines on combined list to conform with L-248.		3-2-43
	Amendment 2		Amends List A-2, Military Exemption List and Combined List.		4-6-43
	M-9-c-1	Copper	Curtails and finally limits use in shoe findings.		1-23-42
	Amendment 1		Modifies use in shoe production.		5-23-42
12-4-42	M-9-c-2	Copper	Limits use, delivery and acceptance in jewelry.		4-4-42
	M-9-c-3	Copper	Restricts manufacture, delivery and acceptance of bronze powder products, articles.		12-28-42
12-10-42	M-9-c-4	Copper	Restricts the installation and delivery of copper or copper base alloy pipe or tubing and/or building material after 7-22-42, with specified exceptions.		11-18-42
	M-11	Zinc	Regulates delivery, acceptance, remelting, toll agreements, substitution, reexportation.	62, 94A, 450, 451, 452, 453	2-9-43

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Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued- Effective	Order No.
M-11-a.	Amended	Zinc oxide	Permits production allocation of zinc oxide, permits deliveries to one customer up to 2,000 pounds per month.	62	3-20-4	N72... N72-a...
M-11-b	Amended	Zinc	Limits and finally prohibits use in manufacture of List A items, and curtails use in manufacture of all others with specified exceptions.	500	11-26-4	N78...
M-11-1...	Amended	Zinc dust	Establishes allocation control.	752, 755, 758	3-23-4	N78...
M-17		Pig iron	Establishes reserve pool for allocation and restricts delivery.	69, 70, 71, 71D	8-1-4	N41...
	Letter of 8-14-41.		Establishes September pool.		8-14-4	
	Amendment 1		Further clarifies and changes delivery regulations.		10-14-4	
	Extension 1				11-25-4	
	Amendment 2		Further regulates delivery.		3-28-4	N49...
	Extension 2					N45...
M-18-a.	Supersedes M-18.	Chromium	Limits use of oxide and permits allocation.	53B, 707	11-29-4	
	Amendment 1		Limits melting of ferro-chromium.		1-13-4	
	Amendment 2		Limits melting of chromium.		2-4-4	
	Amendment 3		Order extended until revoked.		7-1-4	N47...
M-18-b	Amended	Chromium chemicals	Restricts inventories of primary chromium chemicals; requires monthly report of consumption of 500 pounds or over.	54	1-7-4	N400...
	Amendment 1		Extends order until revoked.		5-30-4	
M-21	Amended	Steel	Conserves supply and directs distribution. PD Forms: 99, 99A, 99B, 99C, 138, 139, 307, 308, 474, 612, 614, 701.	See abstract column.	12-29-4	M100-a...
	Amended		Changes order to conform and function with C. M. P.		4-1-4	
M-21-a	Amended	Alloy iron, alloy steel, electric furnace carbon steel.	Establishes allocation control.	391, 391A	3-24-4	M100...
					4-1-4	
M-21-b	Amended	Steel warehouses	Restricts acceptance of delivery by warehouses to quotas of Schedule A and B products; limits deliveries by warehouses and dealers; permits D. G. O. to issue special directions; restricts extensions of higher ratings.	83, 83E, 83F, 83G, 83H, 831, 700.	3-6-4	N410...
M-21-b-1		General steel warehouses and dealers.	Establishes procedure whereby distributors may obtain general steel products from producers and others for delivery to distributor's customers under CMP.	83, 83B, CMP-11	3-29-4	M10-a...
					4-1-4	
M-21-b-2		Merchant trade products warehouses and dealers.	Establishes CMP procedure for distributor to obtain deliveries of merchant trade products from producers and others.	83E, 83F, 83G, 831	4-1-4	
M-21-c	Amended	Steel plates	Allocates entire supply.	160, 169A, 298, 299.	7-27-4	M112...
M-21-d	Amended	Corrosion and heat-resistant chrome steel.	Limits consumption, use, processing, fabrication or delivery to orders rated AA-5 or higher and A-1-k in certain specified instances.		11-18-4	M118...
	Interpretation 2		Approval for melting or delivery on PD-391 is specific authorization as required by paragraph (a).		12-11-4	M128...
	Corrected copy.					
	Interpretation 3		Rules that approval on PD-391 or PD-707 is specific authorization, as required by order.		1-6-4	
M-21-e	Amended	Tin plate, terne plate and tin mill black plate.	Restricts use, production, sale, delivery and inventory; restricts use of waste-waste, terne metal, tin.	612, 614, 767	12-11-4	M130...
M-21-g		Heat resistant chromium or chromium nickel alloy iron and alloy steel.	Limits the chromium and/or nickel content of heat-resistant chromium or chromium-nickel alloy iron or alloy steel for the uses set forth in Schedule A.		7-3-4	M143...
						M146...
M-21-h	Corrected copy	Tool steel	Restricts melting, delivery, toll agreements, production.	440	12-14-4	M148...
M-23-a	Amended	Vanadium	Establishes allocation control; restricts melting.	209A, 209B, 707	12-26-4	
M-24	Amended	Iron and Steel scrap	Directs the distribution.	149, 150, 151	11-19-4	
	Corrected copy.					
M-24-b		Iron and steel scrap	Provides for scrap segregation.		4-22-4	
M-24-c	Amended	Iron and steel scrap	Provides for segregation of specified types of alloy scrap and prohibits the mingling of such segregated scrap with other unclassified scrap.		10-18-4	
M-28	Amended	Tungsten	Regulates inventory, delivery, acceptance, and allocation.	9C, 9D, 9E	2-4-4	
M-28-b	Amended	Tungsten	Restricts and finally prohibits use in specified items.		2-6-4	
M-28	Amended	Lead	Regulates shipments, deliveries, and reserve pool for allocation.	66A, 124, 234	1-1-4	
M-28-c	Amended	Lead	Regulates use in specified items.		2-3-4	M156...
M-39	Amended	Cobalt	Establishes allocation control, restricts use; revokes M-39-b.	581, 582	3-6-4	M160...
M-43	Amended, Revokes M-43-a.	Tin	Prohibits use in manufacture of List A and B articles; restricts use in Schedule I; restricts deliveries; allocates pig tin.	213, 229	1-6-4	N162...
M-43-b		Tin	Restricts use in certain gas meters after 2-15-43, subject to specific provisions.		1-26-4	
M-45	Combined print, 9-30-42	Sheet steel for steel drums	Reserves inventory for allocation.	156A	11-17-4	N165...
	Amended		Eliminates reference to P-76, which is revoked.		4-8-4	
M-49	Amended	Iridium	Restricts use and sale in jewelry.		10-26-4	N191...
M-59		Palm oil	Conserves supply and directs distribution.		3-20-4	N196...
M-63	Amended	Imports of strategic materials.	Restricts importation of materials on Lists I, II, III; also restricts use.	222A, 222B, 222C	3-5-4	N198...
	Interpretation 2		Defines meaning of term "in transit".		3-5-4	N198...
M-63-a	Amended	Imports of strategic materials.	Exempts materials on List III of M-63 from provisions of order subject to certain conditions.		3-5-4	N200...
	Corrected copy.					
M-63-c		Imports of strategic materials.	Prohibits importation of mica from India and Brazil after 9-30-42, only upon specific authorization.		9-30-4	N211...
M-63-e		Imports of strategic materials.	Prohibits imports of quartz crystals unless authorized.		11-26-4	N221...
					12-7-4	
M-63-f		Imports of strategic materials.	Cuts off shipments of balsam wood under existing contracts except where it has been prepared for shipment to U. S., and is not aero grade.		12-8-4	N231...
M-65	Amended	Cadmium	Prohibits delivery except to distributors or pursuant to specific authorization and prohibits acceptance unless in accordance with Priorities Regulation No. 1.	441, 442	6-17-4	N233...
					6-24-4	N25...
M-65-a		Cadmium	Regulates use, sales, deliveries, and inventories.		1-17-4	N26...
M-68	Amended	Oil industry production material.	Conserves material with specific use exceptions.	214A, 214B, 214C	1-4-4	
	Interpretation 2		Defines "leased equipment".		3-15-4	N27...
M-68-e	Amended	Oil industry, marketing material.	Prohibits construction, reconstruction, expansion, remodeling, or installation of equipment, advertising material, tank trucks, or trailers, subject to specified exceptions.	215	3-3-4	N28...
						N29...
M-68-1		Oil industry production material.	Exempts wells in specified areas.		3-13-4	N29...

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Issued— Effective	Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued— Effective
	M-72	Amended.....	Lead and tin scrap.....	Conserve supply and directs distribution.....	249, 254, 254A.....	8-18-42
3-20-42	M-72-a	Amended.....	Tinned and detinned scrap.....	Provides restrictions on tinned and terneplate scrap; establishes procedure to acquire used tin cans; establishes regulations for collection, segregation and disposal and preparation of used tin cans in specified counties; restricts sales.		10-20-42
11-26-42	M-75		Land Turbines.....	Establishes orderly production schedule.....		3-9-43
3-23-42	M-75	Amended.....	Mercury.....	Prohibits and restricts use in Lists A and B respectively, and limits use in other items, all subject to specific exceptions.		8-5-42
8-1-42	M-77	Amended.....	Cans.....	Restricts manufacture, sale, delivery, purchase, acceptance of delivery and use of those made from tinplate, terneplate or blackplate.		3-12-43
8-14-42				Clarifies meaning of "frozen" plate.....		2-22-43
10-14-42	M-79	Amended.....	Corundum.....	Allocates corundum ore, grain, and superfine flours.....	293, 293A, 294, 294A.....	9-16-43
11-25-42	M-85		Rhodium.....	Prohibits electroplating or deposition on jewelry.....	295.....	3-11-42
3-28-42		Amendment 1.....		Prohibits use of rhodium or rhodium alloys in manufacture of jewelry.....		4-17-42
11-29-42		Interpretation 1.....		The term "Jewelry" as used and defined in order includes silver deposit glassware.		5-21-42
1-13-42		Amendment 2.....		Extends order until revoked.....		10-26-42
2-4-42	M-77		Coal and coke.....	Permits accumulation of excess inventories.....		2-12-42
7-1-42	M-80		Light, medium, heavy trucks, tractors and trailers.	Truck rationing order.....	310, 321, 322, 326, 326A.....	2-28-43
1-7-42						3-9-42
5-30-42		Amendment 1.....	Rationing of new commercial vehicles.	Redefines "sales agency" and includes "mine products" in Schedule A.....		5-28-42
12-29-42		Amendment 2.....		Changes definition of "new commercial motor vehicle".....		7-24-42
4-1-42	M-100-a		Rationing of new commercial motor vehicles.	Provides for country-wide inventory of "new commercial motor vehicles" at close of business 7-31-42.	571, 572.....	7-24-42
3-24-42	M-109	Amended.....	Rough diamonds.....	Requires all sales or transfer of industrial diamonds, including sale for export, be specifically approved by the Director General for Operations except for relatively small amounts or for orders with A-1-j rating or higher.	376, 377, 378.....	11-11-42
4-1-42	M-110	Amended.....	Molybdenum.....	Establishes allocation control; restricts processing.....	358, 359, 360, 707.....	1-9-43
3-29-42		Interpretation 1.....		Clarifies extent of restrictions on molybdenum-bearing chemical compounds.....		3-11-43
4-1-42	M-110-a		Molybdenum.....	Permits receipt of up to 500 pounds monthly subject to certain provisions, by solely reporting on PD-359; permits others than producers of iron and steel to melt not to exceed 500 pounds monthly.	358, 359, 360.....	11-6-42
4-1-42						
7-27-42	M-112	Amended.....	Antimony.....	Establishes allocation control, subject to specified exemptions; prohibits use in certain products.	380, 381.....	3-8-43
11-18-42	M-115	Amended.....	Collapseable tin, tin-coated and alloy tubes.	Restricts manufacture, sale and delivery of blanks and tubes and upon uses.....		1-13-43
12-11-42	M-126	Amended.....	Iron and steel conservation.....	Curtails and prohibits use in specified items, with governing date of such restrictions.	500.....	12-26-42
1-4-42		Amended.....	Iron and steel conservation.....	Revises order to eliminate conflict with other orders since issued.....	500.....	4-8-43
12-11-42	M-130	Amended.....	Passenger automobiles.....	Regulates manner of sale to specified Government Agencies; amends transfer restrictions of new Chevrolet, Ford and Plymouth passenger cars to Ordnance Department prior to 1-1-43.	501, 502.....	11-2-42
7-2-42	M-143		Indian kyanite.....	Completely allocates supply.....	496.....	5-0-42
	M-148	Amended.....	Quartz crystals.....	Restricts fabrication, purchase, receipt and use to specified items; permits for special directions by D. G. O.	484.....	3-8-43
12-14-42	M-148	Amended.....	Exports under licenses issued by the Board of Economic Welfare.	Permits Director General for Operations to grant to BEW. specific authority to assign specific preference ratings to specific quantities of material for export, and lifts restrictions with respect to deliveries so rated where restrictions apply to inventories in foreign countries; establishes application or extension procedure.		1-18-43
12-26-42						
11-19-42						
4-22-42		Supplement 1.....	Exports under licenses issued by the Board of Economic Warfare.	Establishes export quotas for steel products listed in Schedule A attached.....	748, 749.....	10-13-42
10-13-42						
2-4-42		Supplement 2.....	Exports under licenses issued by the Board of Economic Warfare.	Assigns AA-2X rating to purchase orders for "control material" in Exhibit A of order, or for delivery to holder of export license covering such material issued prior to 10-1-42 on which delivery date is specified.		10-15-42
2-9-42						
1-1-42	M-156		Tantalum.....	Allocates entire supply.....	487, 488, 489.....	5-22-42
2-2-42	M-160		Beryllium.....	Complete allocation control after 7-1-42.....	496, 497.....	6-1-42
3-9-42	M-162	Amended.....	Platinum.....	Restricts sale, purchase, and delivery.....	512, 513, 514.....	10-31-42
1-4-42		Interpretation 1.....		Defines meaning of "process" in regard to sizing of rings and repair of jewelry.....		12-19-42
1-26-42		Interpretation 2.....		Redefines term "assemble".....		1-4-43
11-17-42	M-185		Cyanamid.....	Establishes allocation control.....	237, 504.....	5-30-42
4-8-42		Amendment 1.....		Revises order to include cyanides.....		
10-26-42	M-191		Lithium compounds.....	Establishes allocation control.....	585, 586.....	7-16-42
3-20-42	M-198		Cryolite.....	Establishes complete allocation control.....	592.....	9-18-42
3-5-42						10-1-42
	M-199	Amended.....	Silver.....	Restricts sale, delivery, purchase, receipt, and manufacture to specific uses.....		2-25-43
3-5-42		Corrected copy.....				
3-5-42	M-200	Amended.....	Fluid milk shipping containers.	Restricts manufacture by specifications and content; restricts use of steel.		
9-30-42	M-211		Heat treating equipment.....	Allows for scheduling of production and deliveries without regard to prior or subsequent preference ratings.	680.....	8-22-42
11-26-42	M-225		Overhead traveling cranes.....	Provides for scheduling of production and delivery in accordance with specific directions by the Director General for Operations.		9-7-42
12-7-42						
12-8-42	M-230		Phosphorous.....	Establishes complete allocation control.....	600, 601.....	9-9-42
6-17-42	M-233	Corrected copy.....	Gas cylinders.....	Controls production and delivery by permitting Director General for Operations to issue specific directions in those regards.	602.....	9-30-42
6-24-42	M-253		Lithium ore.....	Establishes complete allocation control.....	728, 729.....	12-5-42
1-17-42	M-261	Amended.....	Strapping for shipping containers.	Restricts use to specific container weights, uses, destinations, contents, or to comply with ICC regulations.		2-4-43
1-4-42						
3-18-42	M-276		Bismuth.....	Assures conservation and control to provide for military and other essential uses.....	776.....	1-19-43
3-4-42	M-292		Coke.....	Permits D. G. O. to issue specific directions regarding source, destination, amount, type or grade to be delivered by producer or dealer.		3-12-43
	M-293	Plus errata sheet.....	Critical common components.	Regulates placing, acceptance of orders; permits D.G.O. to allocate production and delivery; requires filing of specified forms to carry out program.	900, 901, 902.....	2-26-43
2-12-42	M-296		Ferrocolumbium.....	Establishes complete allocation control.....	391, 707, 805.....	4-1-43
						3-25-43

PRIORITIES

Current "P" Orders

To Facilitate the Acquisition of Materials

Order No.	Additions Modifications	Subject	Purpose	Related PD forms	Issued Effective
P-14-a		Shipway construction	Assigns preference rating to material for construction		7-124
P-14-b		Shipway construction	Assigns preference rating to material for construction		7-124
	Amendment 1		Raises rating to A-1-a		As
P-19-a		Road projects	Assigns preference rating to material for construction	200	10-160
	Amendment 1		Confines purchases to materials physically incorporated in the project and to parts required for maintenance and repair of equipment in active use on project.		3-40
	Amendment 2		Amends the assignment of preference ratings and the restrictions of the use of rating.		5-44
	Amendment 3		Permits use of rating to obtain lumber, false work		3-270
P-19-h	Supersedes order of 2-28-42.	Construction of rated projects.	Assigns preference rating to material for construction	200	3-10
P-19-i		Aluminum and magnesium plants.	do		As
	Interpretation 1		Interprets "Protection of Delivery Date"		5-64
	Supplement 1	Material for construction of rated projects.	To allow application of project rating to obtain expendable material. A supplemental order rather than an amendment is issued to permit a separate method of application of extension of rating to conform with Priorities Regulation No. 3 Amended.		7-73
	Amendment		Revokes provision regarding "protection of delivery dates", and deliveries of materials are to conform to applicable provisions of Priorities Regulation No. 1.		9-174
P-19-j		Construction	Raises former AA-4 ratings assigned to builder under P-19 series, when still in effect, to AA-3, except where issued to F. P. H. A.		1-116
P-19-k		Construction	Assigns AA-3 rating to deliveries of material to builder if previously assigned rating under P-55 or by issuance to F. P. H. A. of a Preference Rating Order P-19-d or P-19-h.		1-114
	Amendment 2				2-140
P-31-a		Foundry equipment and repair parts.	Permits suppliers and subsuppliers to extend rating assigned under P-31 which expired on 5-30-42.		6-40
P-43	Revised	Research laboratory supplies and equipment.	Assigns AA-X and AA-4 ratings to deliveries of materials.	107, 620	11-44
P-47	Amended	Air transportation facilities: maintenance and repair.	Assigns AA-1 rating to deliveries of material as requested for and authorized on PD-96; establishes rerating procedure.	96	10-40
P-55	Amended	Construction of defense projects.	Assigns preference rating to deliveries of material; restricts use of rating: makes Pri. Reg. No. 3 applicable and provides for countersignatures on purchase orders.	105, 105A, 708	3-124
	Amendment 1		Revokes necessity of countersignature on purchase orders by authorized government official.		3-234
P-55-a		Construction	Establishes conditions applicable to holding and disposition of War Housing Units; applies to rental, sales price, war workers, owners of war housing.		3-204
P-56	Amended	Mines	Establishes procedures for producers to obtain maintenance, repair, operating supplies, mining machinery, and other material and equipment; CMP Reg. No. 5 not applicable.	400A, B, C, 542, 658, 695, 731, 812.	3-174
P-68	Amended Corrected copy.	Iron and steel production: maintenance, repair, and supplies.	Assigns AA-1 to deliveries of materials	148, 228	1-194
P-73	Amended	Non-ferrous smelters and refiners.	Establishes procedures to provide producers with repair, maintenance, and operating supplies; CMP Reg. No. 5 not applicable.	760	3-244
P-84	Amended Corrected copy.	Plumbing and heating: emergency repairs.	Assigns preference rating to material.		12-164
P-88	Amended	Railroad: maintenance, repair and operating supplies.	Assigns preference rating to material.	351	12-224
	Interpretation 1		Permits railroad to repair leased equipment without specific authorization		1-154
P-89	Amended	Chemical plants: maintenance, repair and operating supplies.	Assigns ratings of AA-2X for delivery of metals, parts and equipment, the unit cost of which does not exceed \$200, and AA-5 to all other orders, both subject to specific conditions: application and extension of ratings governed by Priorities Regulation No. 3; restricts inventory.	315, 762	1-804
P-98-b	Amended	Production, transportation, refining and marketing of petroleum.	Assigns AA-1 and AA-2X ratings in addition to A-2 and A-1 for operators.		1-814
P-98-c	Amended	Production, transportation, refining and marketing of petroleum.	Regulates sales between operators; restricts acquisition and use of materials; establishes material redistribution program.	311, 311C, 470	3-244
P-122		Military and naval air-craft.	Assigns higher ratings to certain deliveries		3-104
P-123		Defense projects: maintenance, repair, and operation.	Assigns preference rating to material.		3-124
P-126	Amended	Material for emergency servicing of commercial refrigerating air-conditioning systems.	To deliveries of materials assigns AA-2X to Class I, AA-3 to Class II, and AA-4 to Class III emergencies; prohibits use of rating for comfort cooling.	369	2-44
P-133	Amended	Electronic equipment	Assigns AA-2X rating to deliveries of material for operating supplies, maintenance and repair for both operators and suppliers, subject to specified restrictions; provides for application and extension of rating.		2-44
P-134		Repair, maintenance, operation of metal mills working copper, zinc, copper-base alloys or zinc alloys.	Assigns AA-2X and AA-5 to deliveries of materials	742	12-314
	Revocation	Copper, zinc, copper-base alloys or zinc alloy mills.	Revokes the order		4-154
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